

Southwest Texas
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Bulletin 3.

Big Bend Basket Maker
Papers No. 3.

by

GEORGE C. MARTIN

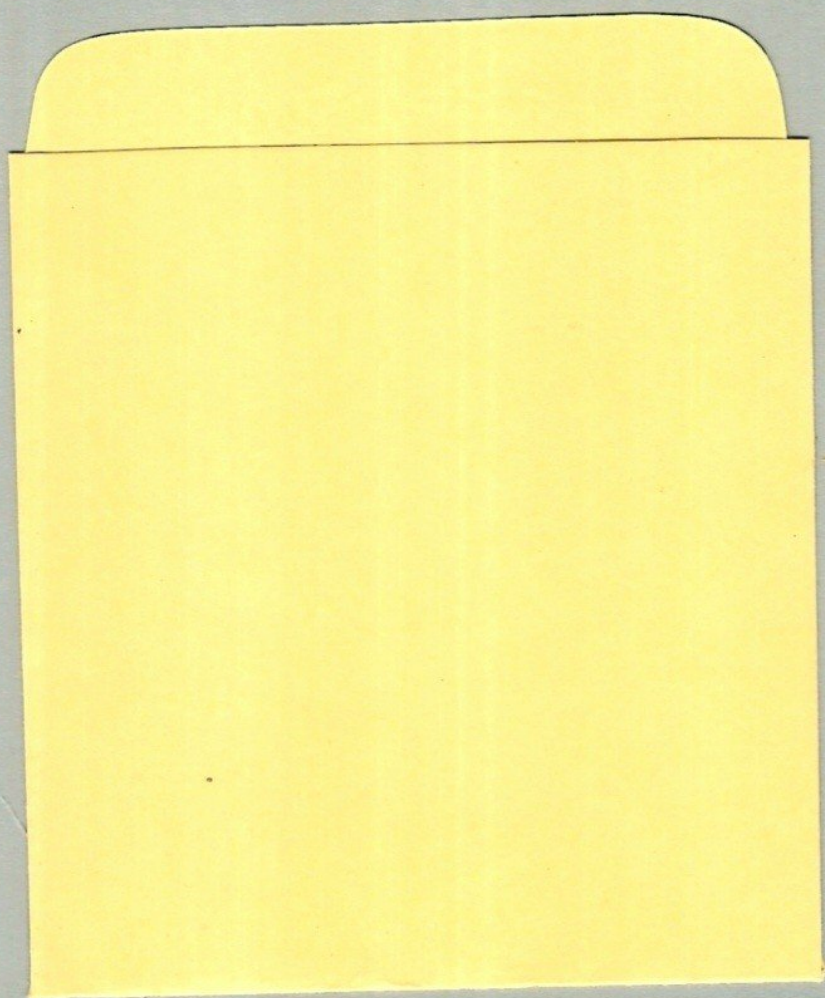
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Archaeological Exploration of the Shumla Caves

Report of the

GEORGE C. MARTIN EXPEDITION

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Southwest Texas Archaeological
Society

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Witte Memorial Museum

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June, July and August, 1933.

by

GEORGE C. MARTIN

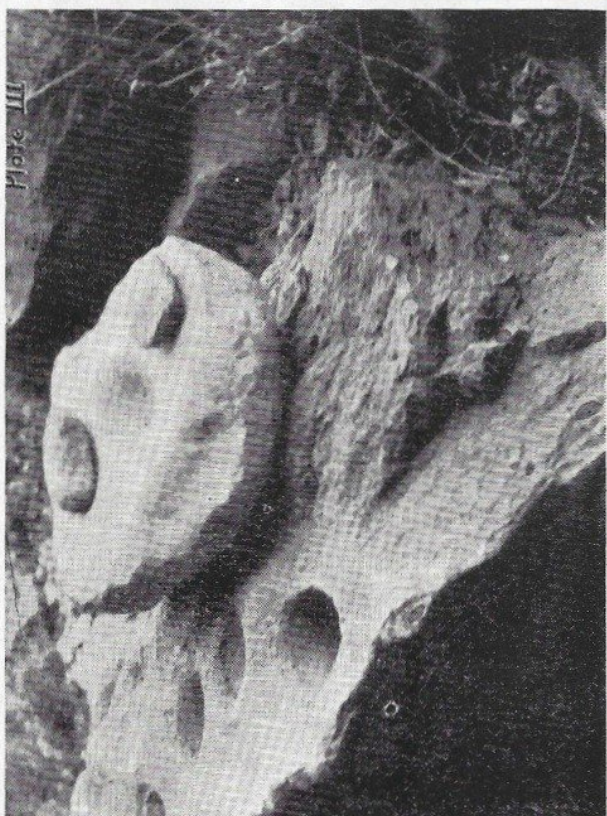
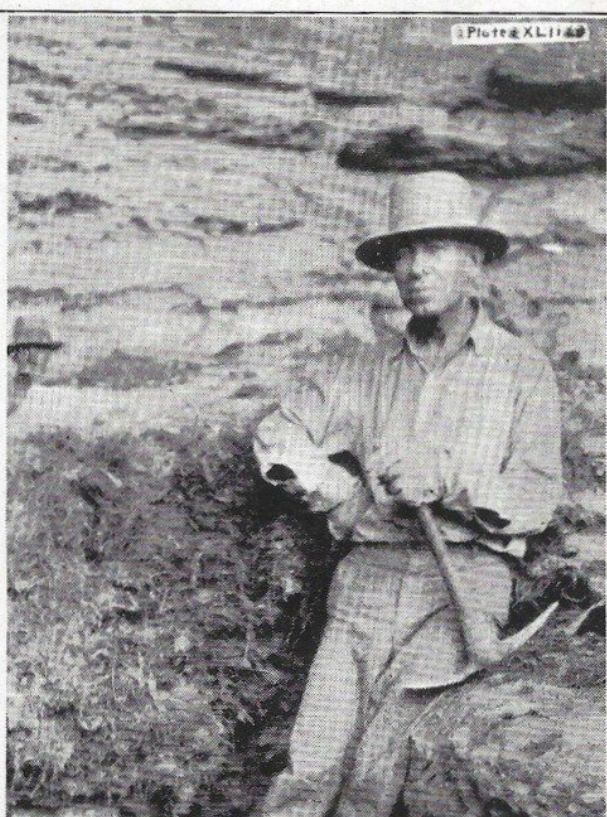
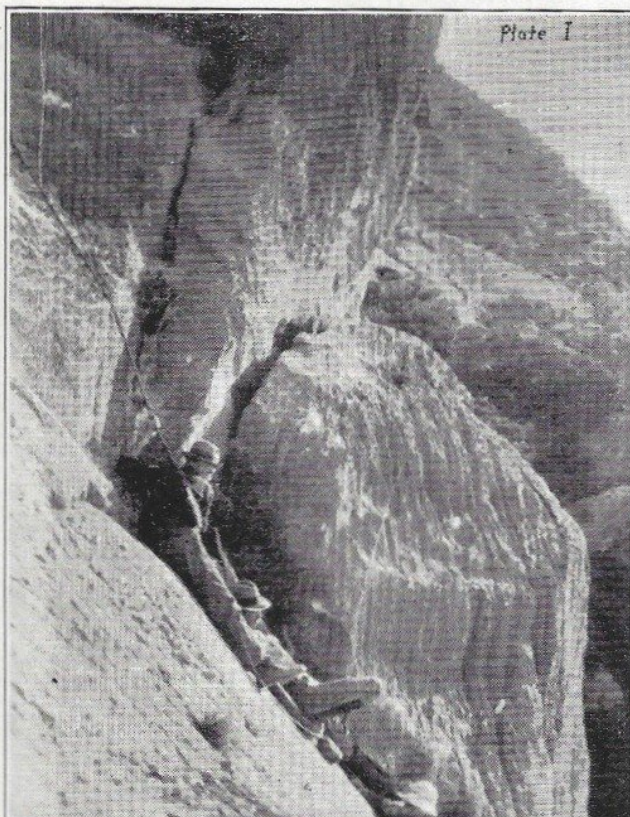


Plate I. The path to Caves No. 1 and No. 2, Messrs. Lehman, Davenport, and Black, making the descent. Plate XLII. Deep fiber layer in Cave No. 5, John S. Eross in trench. Plate XL. Burial in Cave No. 5, matting, baskets, pouch, and fish net in place. Plate III. Large stone at entrance of Cave No. 5, on it a mortar and metate combined, with accompanying manos from Burial No. 9, Cave No. 5.

P R E F A C E

Almost a half century ago scientific investigators of ancient life in the Southwest first brought to light evidence of a prehistoric people whose beginnings reached into a far dimmer era of antiquity than any of those aborigines whose characteristic dwellings are so prevalent in the Southern ranges of the Rockies. These older people were called Basket-makers, an ethnological group until recent months as indefinite as the Slabhouse people or the Mound Builders of the Mississippi basin.

Within recent years some of the major museums and institutions have devoted much attention to the Basket-maker, seeking to fix him in the indistinct pattern of life which moved across the continent with so light a tread as to be merely suspected.

To-day, the scientist with his trowel has lifted the curtain of the centuries, and now adds to the sum of human knowledge the story of a new race of people.

In this painstaking work the Southwest Texas Archaeological Society in its expedition of the summer of 1933 takes a place as one of the principal contributors to the opening of the Basket-maker Book.

To Mr. George C. Martin, the leader of the expedition, goes the privilege of writing the report which clears up much of the controversial matter concerning the Basket-maker whose dim imprints in dusty cave shelters from Idaho to Central Mexico and from Arizona to the Mississippi have provided American Archaeologists their greatest mystery.

It seems most remarkable to the writer as he recalls standing high up on a mountainside, under Pommel Perk in the Chisos mountains, a few years ago with Mr. Martin, who, with exceedingly slender evidence, a mere stick of sotol with cup-shaped depression in its end, first called the people of the Brewster County caves "The Big Bend Basket Makers." Since that time the designation has been questioned, but to-day, the Shumla man evolves a full fledged Basket Maker.

SAM WOOLFORD.

Foreword



THE George C. Martin Expedition to explore the cave shelters of the Rio Grande region west of the Pecos river was organized by the Southwest Texas Archaeological Society, Witte Memorial Museum, San Antonio, in April, 1933.

As originally enlisted the field force consisted of George C. Martin, archaeologist; Major Fletcher Gardner, commissary; John S. Eross, in charge of field operations; J. Walker Davenport, artist; Jack Specht, photographer; Everett Lehman, Harding Black, Albert Maverick III, George C. Martin, Jr., John Davis and George Nalle, Jr. Replacements to the original crew were John A. Ray, Gustave Bentrup, and Burton Waters. None of the party received any remuneration for their labors. Major Gardner accompanied the party to the site of operations, but was obliged to return to San Antonio before excavation work was begun.

The expedition was financed through the untiring effort of Mrs. Ellen Schulz Quillin, Curator of the Witte Memorial Museum, currency and provisions donated by citizens of San Antonio at her solicitation.

Due to the courtesy of Dr. H. B. Ross, of Del Rio, and of his superintendent and leasee, Mr. Russell Glynn, all of the caves along the Rio Grande and Pecos, on the Ross ranch, were placed at the disposal of the Expedition.

Nine caves in the Shumla district were investigated, five thoroughly, three in part, and one which had been previously prospected by the writer was completely excavated. Hundreds of interesting specimens were obtained, some hitherto unreported and unique, and much data was gathered together which will aid materially in reconstructing the history, customs, and mode of living of some Texas aborigines of pre-European days.

THE CAVES, TOPOGRAPHY AND GENERAL DESCRIPTIONS.

The caves explored by the expedition in June, July, and August, 1933, lie on the Ross ranch near Shumla. The small group of habitations bearing this name is clustered together about a half mile north of the Rio Grande in Val Verde county. The banks of the Rio Grande in this vicinity form cliffs three hundred to three hundred and fifty feet above the present river-bed. There is but little talus on the American side, none on the Mexican. Milo cañon enters that of the Rio Grande from the north. The expedition made camp May 28th, 1933, on a hilltop crowning the cliffs at the junction of the cañons. The cliff walls contain numerous large and small caves that have been inhabited, as witnessed by their sooted ceilings, but many of them are now barren of the debris of their occupants.

Two caves in Milo cañon were selected for excavation, these one hundred feet below the surface level, and about two hundred and fifty feet above the present bed of the Rio Grande. They are so close to the river that a stone may be thrown from either entrance to the water. A third cave, barren of human relics, forms part of this group, and, to facilitate the working of the other caves in the vicinity, this was set aside as a kitchen and dining room for the expedition. A cave below and south of the dining room was designated as Cave No. 1, another at the same level and to the north of this as Cave No. 2. Another in the cañon wall of the Rio Grande, a few yards east of Milo cañon, was recorded as Cave No. 4, two to the west of the cañon as Caves No. 3 and No. 5. Westward, in the Rio Grande cañon wall, about two miles, the old Shumla cave, which had been mentioned in previous articles by the writer under that name, was permitted to retain its original appellation, while a cave three miles further westward was called Cave No. 6. Cave No. 7, is at the mouth of an unnamed cañon a half mile west of Cave No. 6. The ninth cave is on the south side of the Pecos, about two miles northwest of Shumla. It has been styled "Pecos Cave No. 1.". Of the nine caves investigated five face southerly on the Rio Grande, two southeasterly on Milo cañon. one in the same direction on an unnamed cañon. The ninth faces

northerly in the cañon of the Pecos. All but the last, which is not so high, are situated from two hundred to two hundred and seventy-five feet above the river, and have not been reached by high waters therefrom since they were first occupied. They are perfectly protected from drainage from above, and only at their entrances has rain blown in and wetted the ash and fiber debris.

Access to most of the caves is from above. Plate 1, depicts the descent to Caves No. 1 and No. 2, the background a view northerly up Milo cañon. Messers Lehman, Davenport, and Black, expedition members, are shown making the descent. Cave No. 4 was reached only by descending to the bed of Milo cañon, crossing it, and then ascending a very steep talus of huge boulders.

Water can be obtained from a very fine spring, or from the river, at the mouth of Milo cañon, and thus Caves No. 1, No. 2, and No. 4 supplied. The writer believes, however, that at the time the caves were occupied the site of the spring was still covered by the river and that only water from the stream was used. A two-foot rise in the river during the excavations covered the spring and made its water unobtainable. Caves No. 3 and No. 5 had no close access to the river, sheer cliffs rising below them, unless the stream-bed was much higher than at present, which was probably the case. Water might have been carried from Milo cañon, but baskets for that purpose were not found in Cave No. 3, and only one which would have so served in Cave No. 5, and nothing in the way of possible skin containers in any of the caves. Indications point to a less deeply sunken bed for the Rio Grande, or a far-greater-than-present flow therein which would have raised its level to reachable height, that is, above the unscalable cliffs to a point which could have been reached by climbing downward from the habitations. Access to the river from old Shumla cave and Caves No. 6 and No 7 is very difficult.

Flora, fauna, and climate appear to be about the same at present as when the caves were inhabited. Bear, bison, and antelope no longer roam over the vicinity, but, their absence is not due to climatic change. The trees, shrubs, and fibrous plants represented in the cave debris all still thrive in the locality of the caves, and most of their mouths are screened by berry, bean, and nut-bearing, stunted trees, descendants

of those which grew from seeds dropped or planted by the Indians. "Planted" is the probably correct word, as seeds of most of them, these packed away carefully in bundles of grass and fiber, have been found in the caves. These packets contained too few seeds for them to have been stored for food purposes.

Although differing greatly in size, the Shumla caves were all evidently "one-family" residences, not communal. Slab cists, by some called "housesites", have not been found in any of them to date. In most cases the walls of the cave formed the all-purpose room. In a cave in the Chisos mountains, in the rim-rock under Pommel peak, the Woolford-Martin expedition found caves of culture otherwise identical with that of Shumla containing splendid examples of fiber-chinked slab cists.

In Cave No. 7 an alcove six feet wide and four feet in height (measured at the level existing when used) had been partitioned off from the balance of the cave by a structure made of saplings interwoven with small sticks and sotol stalks. This screen consisted of three upright staves with the bark left on, the butts sharpened and thrust eight to ten inches deep into the ashes of the flooring about two feet apart. Across these other and lighter staves had been interwoven horizontally, and then more light sticks fastened vertically thereto. Some of the junctions of horizontal and vertical pieces were tied into place with twisted fiber cord. Over this frame clumps of grass were woven diagonally. The entire shield measured about six feet in height and five feet in breadth, and had screened the alcove rather than enclosed it. When uncovered, the entire structure, except the pointed ends of the three principal staves, lay as it had originally fallen, the grass covering in place, strings still holding the frame together. Ten inches to a foot of ashes covered it. The pointed ends of the three upright staves were still in place in the ashes, vertical, not leaning, and were still attached to the uprights, from which they had been broken, by shreds of wood and bark. See Plate XXXVII, which shows reconstruction of this screen.

The Shumla caves revealed but a single culture from hardpan to surface. Previous investigation by the Woolford-Martin expedition in the old Shumla cave and other shelters of the vicinity had convinced the writer of that fact, and this know-

ledge permitted more freedom of action in excavating than would have been possible had there been several cultures, one, overlying the other. In fact, the caves were so much alike that, the description of one of them suffices for that of any other. Energetic and indolent families were pictured by their homes and the remains therein, but all of one culture. Individual poverty and affluence were portrayed by the finds, as were tastes and abilities. The "Artist's cave" contained more than its share of painted pebbles and pictographs, but, alas, food-refuse, weapons and other artifacts were scarce. In the "Fisherman's cave," articles, and remnants of food-stuffs found point toward fishing as a preferred means of subsistence, while the "Hunter's cave" yielded numerous weapons and implements of the chase, with animal bones prevailing in quantity in the refuse.

Pictographs decorate the walls and ceilings, frequently outlines of hands, a deer, a snake, and many designs un-nameable, these indistinct by reason of wall-scaling or powdering. Some of the cliffs are of very soft limestone which is more apt to disintegrate by powdering than by scaling. Graves frequently have pictographs of hands above or near them, and several interments were located in this way. These, however, were not found to be infallible indications of burial, no interments located in the vicinity of some of them.

External sites exist in proximity to every cave in the Shumla region, the types of stone artifacts found thereon indicating that they were occupied by the cave inhabitants. In most cases these outdoor sites are on the cliffs above the caves, and such shelters can be located merely by looking for flint chips on the ground, the descending of the cliffs nearby invariably revealing a once-occupied cave.

The cave inhabitants along the Rio Grande were not nomadic. No evidence of maize was found at Shumla, but despite this the Indians were sedentary apparently dividing their time between the indoor and outdoor sites of one vicinity. The burials in Cave No. 5, later to be described, indicate one family as occupying that shelter for many years. Seeds of trees, bushes, and grasses, some of which would require years of growth before maturity and productive age, were found cached in the caves in quantities too small to have been stored for food purposes. Three gourd seeds, seven juagilla beans,

about one hundred grass seeds carefully stored in grass or fiber bundles would indicate seed, not food. The writer lays stress on the non-nomadic indications of the Shumla district as most archaeologists apparently have a fixed idea as to the roaming propensity of most of the American tribes. Other evidences of the sedentary habit of the Shumla cave dwellers will be stressed as this report proceeds.

A contemporary writer mentions certain West Texas caves as having floors that were built-up and leveled as though external material had been carried into the caves and actual labor exercised in the building-up and leveling of them. He refers to successive layers of fiber and ashes as though they represent successive periods of occupancy and vacancy. This does not apply to the Shumla caves, the stratas of which were all, excepting the original alluvial deposit in them, and excepting materials fallen from ceiling and walls, caused by occupancy and formed while they were inhabited. There are stratifications in caves which are significant of occupancy and vacancy, but not those of the Rio Grande section of Texas. In order to place the matter clearly before the reader a word picture of an average cave is necessary. Cave No. 5 is typical of those at Shumla, and these typical of most of the shelters of the vicinity.

This cave was formed when the waters of the Rio Grande flowed above and past its present entrance. A soft spot in the cliff, or a bruise made by an immense boulder, either or both combined with a whirlpool in the stream, may have caused the cavity to begin eroding. Water action hollowed out the cliff and continued to wear it out gradually until the cave was formed as at present. The stream-bed became deeper and the surface of the water finally sank below the floor of the cave. Its constant swirling inside the cavity as it passed by caused the flooring of the cave to become bowl-shaped, its center quite deep and sloping upwards at side and back. In the bowl-like depression the river left a bed of reddish, sandy clay. In Cave No. 5, as in all other Shumla caves examined, this alluvial deposit had not been disturbed by human agency. Above it was a thick bed of ashes, on which lay a stratum of fiber. Above this successive layers of ashes and fiber alternated toward the surface. The uppermost layer was a stratum of ashes overlaid with material fallen from ceil-

ing and walls, and droppings of animals. In some caves the fiber layer tops the stratas. Some stratas cover the greater part of the floors, others merely portions thereof. From the time this cave was first occupied to the present time the river has not risen high enough to allow its water to enter the cave, and there is no bed of silt covering any of the stratas caused by human habitation, nor do such stratas shown that they have been wetted since they were laid down except at the entrance. This cave, like most in the vicinity, has a projecting overhang which shields it from drainage from above, and to a certain extent, from the rain. A certain amount of blown moisture and mist from the river, however, affects the ashes close to the entrance. Allowing it six inches under the overhang, where the debris has but little depth, seven or eight feet back toward the rear of the cave the accumulation rises until about four feet is attained, where it levels off toward the rear wall. By "levels off" a gradual lessening of the slope is meant, there being but few actually level spots in any parts of most of the caves, and, where such do rarely occur, they were the result of wind action on the surface, not leveling created by human effort.

It is seldom that any stratum or layer is continuous over an entire cave bottom, unless it is the surface, this made so by wind action over a long continued period of vacancy. In Cave No. 5, excavation under the overhang revealed much charcoal, bones, flint chips, pebbles brought into the cave by the Indians, and burned stones. Here also, the stone artifacts were most numerous. The cooking fires were undoubtedly built under the overhang. Back in the cave were hearths of burned stones but the comparatively small accumulation of charcoal and food-debris suggests that these fires were made more for heat and light than for culinary purposes. The cooking being done at the mouth of the cave under the overhang suggests that much food-refuse found its way out of the caves, this accounting for the few animal bones found in them.

Below the surface layer, the stratas are none of them thickly overlaid with animal manures, nor do any of them show ceiling and wall material deposited more heavily upon them than through them. Had there been long periods of vacancy such a condition might be expected. Stratification during continuous occupancy appears more probable under the con-

ditions shown by the cave deposits than that the same occurred during vacancy. The building-up of the cave floors was actually performed by the wind with material furnished by man. When man was not present to supply the fiber and ashes, up-building ceased. Therefore, both ash and fiber stratas were built-up while the caves were occupied. The picture should be plain to all who have excavated in the caves. The first inhabitants found them in the condition they were in when left by the retreating river ages previously. They found them bare of fiber and ashes, a smooth accumulation of sandy-clay in the bowl-like depression in the center of the cave. Along the entrance was a limestone ledge, and, surrounding the sandy-clay flooring was the stone base sloping upwards to the walls. Whether fiber was actually carried into the caves for use as bedding, or whether it accidentally accumulated there, the waste from the making of baskets, mats, sandals, etc. we do not know. At any rate, it did accumulate on the flooring, and, was used for bedding purposes. Fires were lighted under the overhang and the stage was set for man, working unconsciously with the wind, to build up the floors to their present heights. The fires left ashes. The winds, which are usually strong along the cañons of the Rio Grande, picked these up and scattered them. Most drifted outside where it settled on the cliffs and enriched the soil clinging thereto with its potash content. Vegetation is always more luxuriant close to cave entrances than away from them. Some ash, however, drifted into the cave where it settled on and in the waste fiber and bedding. Had it accumulated on the fiber while the caves were unoccupied such would have been gradually crushed to the floor, a matted mass of mingled fiber and ash. However, there was movement in the cave. Its inhabitants in walking about stirred the fiber with their feet and the ashes fell therefrom and filtered through to the floor level. Lying down, rising, or stirring in sleep affected the bedding in like manner. The identical action that caused the ashes and dust to settle had the opposite effect on the fiber which rose in its dust bed. Small artifacts originally laid down on the fiber also filtered through to the ash levels. This was the case with most of the projectile points of chert found in the caves. In this manner the fiber layer above and the ash stratum below it were actually laid down in reverse order, the former not

purposely carried in and placed upon the ashes. Finally, a fiber bed would become so heavily saturated with ash that it would no longer rise on the stratum formed under and in it, and, it would matte, thus becoming permanently fixed. Additional accumulation of fiber refuse would repeat this process and the course of stratification proceed. Fiber did not accumulate in caves while they were vacant, and ashes did not collect without the presence of humans to light fires. Wood-ashes once laid down in a bed of fiber, unless stirred by human or animal movement, did not shift. No great quantity of ash accumulated under the overhang where there was little or no fiber debris to hold and bind it, the little found there having been too closely packed by rain and moisture to permit it to shift with the wind.

The three indications of periodic occupancy and vacancy which could be accepted as evidence of such would be—

1. Alluvial deposits between habited stratas. These do not exist at Shumla.

2. Animal droppings in fairly numerous quantities on or between layers of fiber or ash below the surface layer. This condition was not found.

3. Quantities of roof and ceiling material lying more thickly over stratas than scattered through them. Another non-existent condition.

The present upper surfaces of the deposits in the caves are excepted, of course, there having existed a long vacancy between last occupancy and present time, and on the surface of the floorings are found the droppings and fallen ceiling material in sufficient quantities to indicate this.

CAVE No. 5, SHUMLA.

Due to the fact that this cave has no accessible place from whence an outside view of it can be obtained its exterior is not pictured herewith. A view of its western interior with the cliffs and the Rio Grande is shown as Plate II. The plan of the cave is depicted by Plate IV. The approximate width of the cave at its mouth is eighty-seven feet, its approximate depth at center forty feet. Where height of the ceiling is not indicated in the plan it varies from seven to twelve feet. Bed-rock is exposed at both sides of the en-



Plate V. Infant mummy in basketry shroud with broken cradle. Cave 5. See page 19.
 Plate VI. Adult skull with hair. Burial No. 9, Cave 5. See page 21.

trance, fifteen mortar-holes existing in the area marked No. 11 on the plan, fifty in that marked No. 12. A fallen rock close to the west side of the opening, under the overhang, bears deep mortar-holes therein. See Plate III. Depicted also in Plate III, resting on the before mentioned rock, is a metate and mortar combined. Apart from the mortar hole in this, the stone bears two depressions caused by use of manos, and in which are seated the two stones which served as such. The three specimens in the group were found with a burial in this cave, these depicted exactly in the positions they were in when uncovered. Another large fallen rock bears in it a few shallow mortar-holes.

This cave was completely excavated, the refuse first examined as removed, then sieved. In the east end of the flooring little was found but flint projectile points, scrapers, and bone implements. These were numerous. The portion of the flooring marked "productive area" (Plate IV) was particularly rich in such specimens. Sixty polished bone implements were removed from this cave, and three hundred and sixty-four perfect flaked artifacts. Manos, metates, fist-hatchets, and flat river-pebbles used in flaking were numerous. Many painted pebbles were found. Fiber and skin sandals were plentiful, as were various types of cordage, mats, fragments of basketry, etc. A pipe of limestone, others of reed with the "tobacco" (cedar foliage) still in them, were taken. The finds in this cave will be treated of hereafter.

Burials were nine in number, probably all but two being of one family group. This was judged by ages, sexes, locations of burials, etc. The trench which located the interments was begun close to the entrance of the cave at its east side, and was carried around the wall at a width of six feet. The ashes were shallow at the entrance deepening rapidly as the trench advanced. Six feet from its place of beginning a fiber-refuse layer was found, which, starting as thinly scattered waste, quickly thickened to a depth of a foot. Several thin fiber layers with stratas of ash between them lay over, and several under, this thick stratum. The area explored by this trench was barren of items of unusual interest, a few sandals, a little cordage, numerous projectile points, and some bone implements, until the section marked "productive area" on the chart was reached. Here almost every handful of debris contained



West end of Cave 5, with view of the Rio Grande and its cliffs.

KEY TO INNER OVERHANG. LIST AND DESCRIPTION OF BURIALS FOUND.

- ▨ 6 in to 24 in.
- ▨ 24 in to 72 in.
- ▨ 8 in.
- ▨ 12 in to 24 in.
- ▨ 18 in.
- Edge of Cave.
- Edge of Roof.



- #1. Adult, on base, 18 in below top, 6 in fiber above and below. Metate on side, depression in direction of face.
- #2. Infant, on base, 18 in below top. Mono, Mat, Broken Cradle with rope. Layer of twigs. Body in basketry.
- #3. Infant, Cremated, 36 in below top. Chared bones in fire mat the whole wrapped in Coarse Mat.
- #4. Remains of Infant burial.
- #5. Adult foreshaft on base.
- #6. Chared remains of adult 18 in. below top.
- #7. Infant - 24 in deep, otherwise same as #2.
- #8. Chared remains of adult 8 in from top.
- #9. Adult, red point rock in upper basket. Metate and Mono headstones. Basket inclosed in fish net. 2 mats folded 2 round baskets inverted, one basket bag containing beads etc. beaver robe. Body also in Beaver robe and in 2 baskets
- #10. Child about 4 years. Skull, lower jaw and arm bones. Soil moist.
- #11. 15 pot holes $\frac{1}{2}$ to 3 in deep. 4 in wide
- #12. 50 pot holes $\frac{1}{2}$ to 1 $\frac{1}{2}$ in deep. 4 in wide.

Productive area.

Fiber and Ash layers
1 $\frac{1}{2}$ Ft. deep front to 3 ft rear

SHUMLA #5 CAVE

Floor Plan

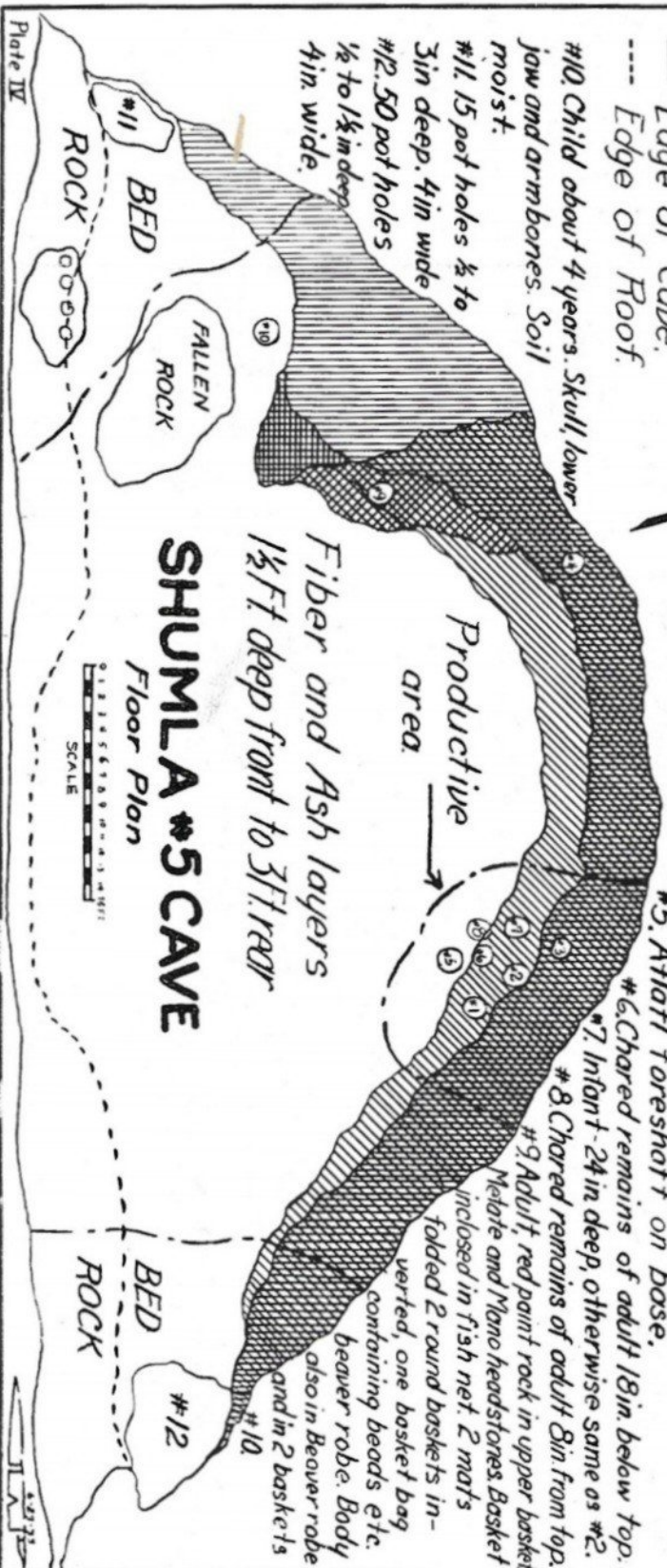


Plate IV. Plan of Cave No. 5.

some item of interest. Projectile points of flint and wood predominated. Polished bone implements were met with frequently in the ash layers, sandals, fragments of basketry and matting, cordage, netting, coilwork, wooden implements, pieces of raw and cured hide, etc. in the fiber stratas. It is of note that the stone artifacts and most of the bone implements were in the ash layers, these seldom found in the fiber. One man was kept busy moving from one worker to another gathering in and recording the specimens. Depth of debris at eastern edge of the productive area was about four feet lessening to about three feet at the wall. The finds mentioned above were scattered through the ash and fiber, and were not introduced with the burials which were near them.

The first burial encountered (No. 1 in the plan) was that of a young adult, evidently a female, flexed, lying on her right side and tied in worn-out mats with twisted strips of netting. The only accompanying article with this burial was a metate standing on its side, the depression therein toward the face of the dead. Above the matting shroud was a six inch layer of refuse fiber, and, below it a similar layer, the latter resting on the cave flooring. Northwest of this grave a second was found (No. 2 on the plan) an infant wrapped in matting, fiber cord passing around the bundle. Above this burial was a metate, grinding surface upward, mano in place upon it. The mano was of small size. The metate rested on a mat of twilled weave which was lying on a thick layer of twigs. Below this was a cradle (elsewhere described) which lay on another mat, the cradle purposely broken, the cord with which it had been attached to the mother, or with which it had been suspended from tree or shrub, coiled upon it. Below the mat and cradle was the little body, or what was left of it, wrapped in a fur-cloth blanket that was badly decayed, all packed in pieces of matting and tied around with a length of netting twisted into a cord. Below the basketry shroud was a second bed of twigs which rested on the stone floor. See Plates V and XXXVI. Portions of this body were mummified, hands, feet, legs, arms, and back, and the skin and hair still remained on the skull. Other investigators of the vicinity and in Arizona have dignified such burials as "mummies", and the writer feels that this specimen and others found in the Shumla district should also be so styled.

The third burial (marked No. 3 on the cave plan) was that of another infant. This body had been cremated. It lay on the stone flooring of the cave thirty-six inches below the surface, charred bones wrapped in a coarse mat. This body was unaccompanied by metate, mano, or other offering.

The burial marked No. 4 on the plan of the cave was encountered by a second trench. It lay in the upper fiber layer without wrappings of any kind, size indicating a premature birth thrust beneath the fiber and forgotten. This interment, if it may be styled such, was the last made in the cave, placed in the fiber very late in the period of its habitation.

Returning to the discoveries made by the first described trench, a circle marked No. 5 is shown on the cave plan. This was not a burial but a foreshaft of size and type used with an atlatl javelin. It rested on bed-rock, its under side thickly encrusted with potash crystals. Above it, layers of ash and fiber, undisturbed, alternated to the surface. Its position is stressed as it bore a thick deposit of juagilla-gum cement with which the chert point had once been attached, and no indication that binding sinews or fiber had been used on it. In this respect it was identical with another foreshaft from old Shumla cave, from the uppermost fiber layer against rear wall, the head in place and cement intact. While the specimen from Cave No. 5 was taken from the proximity of a burial it had not been introduced with the interment, but had become imbedded in the ash when the earliest stratum was laid down. From these two finds it would appear that the custom of cementing the heads of atlatl javelins into place obtained throughout all the period of the habitation of the Shumla caves. The find is mentioned here as it was in close proximity to the burials, and was on the stone base on which the bedding for the bodies also rested. The potash crystals mentioned as encrusting it form only on specimens resting against the stone walls or floor, not on those scattered through the ashes or fiber.

Burial No. 6 was cremated, charred bones of an adult wrapped in matting and tied with fiber cord and twisted fish net. Above this burial lay a metate and mano, upper side of the former about eight inches below the surface. The metate rested on a folded robe or blanket made of hair-cord twined.

It was in very badly decayed condition and powdered at the touch of a finger. Apparently the hair used was that of the bison. It appeared to have had a fringe of hair-cord on at least two of its edges. Around an arm, the bones of which had not been affected by fire, was a bracelet of fiber and twisted cord, a restoration of which is depicted by Plate XXII, figure 7. A bed of cactus (prickly-pear) leaves was laid over the matting containing this body.

Burial No. 7 was that of another infant, practically identical with burial No. 2, with metate, mano, broken cradle, rope to tie it with, fur-cloth, etc. encased in matting and held together with twisted net cord. This infant had, beside the fur-cloth robe, an additional wrapping of fawn skin. Cradle, Plate XVIV, figure 7.

Burial No. 8 was the charred bones of an adult, in matting, and tied with twisted net, the bed of prickly pear leaves covering it just eighteen inches below the surface.

Burial No. 9 was that of an adult male (Plate XL, frontispiece), the most interesting found by the expedition. A layer of twigs and fiber covered this grave at a depth of four feet below the surface. In this portion of the cave was the greatest depth of debris, the cave floor being lower here, and the waste piled in a mound. Under the twigs were two metates and three manos (one pair of the latter with a metate, depicted by Plate III). One metate and one mano had been used in grinding red paint. Below these was a mat, which, on being raised, disclosed a fish net with bow and pole complete, but broken intentionally. See Plate XLIV, figure 2. Two coiled baskets lay on the same level as the net, and beside them an envelope shaped pouch of matting folded and sewed together with rawhide thongs. See Plate XLIV, figure 6. In the net was a mat of chequer weave so designed and folded that it served as a stretcher to keep the meshes well spread. See Plate XLI, figure 3. This was for insertion only when the net was not in use. A fist-size wad of fiber netting had been thrust into the bottom of the net to keep it spread where the net-stretcher did not reach. A flint implement, evidently a fish-knife and scaler was also in the net. Net, baskets, and pouch, with mat that covered them, and mat below them, are depicted in place by Plate XL, frontispiece. The two baskets

were inverted, the dust below them very white and full of the decayed remains of whatever had been buried under them, possibly meal. Beneath these was another mat which covered a folded robe of fur-cloth. Below all of these was the body, flexed, lying on its right side, wrapped in a badly decayed fur-cloth robe, tied in with fiber cord, fur-cord, feather-cord, hair-cord, and twisted netting, the whole encased in matting and resting on a portion of a well preserved mat of fiber-cord-cloth and fur-cloth twined together. This mat is depicted by Plate XLIII, figure 3.

The bones were all in perfect shape in this burial, the hair on one side of the head still in place and undamaged. The latter is of fairly fine texture, slightly wavy, brownish originally but turned gray before death. It was worn undressed, and shaggy, falling below the ear lobes at the sides. See Plate VI.

The pouch accompanying this burial contained what were probably all of the articles of adornment and small articles of every-day personal use required by the man represented by the burial. The pouch was made of checker weave matting sewed into form with rawhide thongs. In its mouth was a gee-string of the last mentioned material age-hardened to the extent that it could not be removed entire. Its identity was confirmed by comparison of its parts with a perfect specimen from a cave near Shumla which was found by Mr. Guy Skiles of Langtry. The second and third articles removed from the pouch were two necklaces of fiber cord woven in figure-eight form over two other cords and forming a band. To the ends were attached rawhide tie strings. The necklaces were embroidered, for their entire lengths, with vertebrae of rattlesnakes, these beaded so closely together that they almost touch each other. Plate XXXIX, figure 6. One necklace is five feet in length, the other five feet and six inches. Kidder and Guernsey, Bulletin 65, Bureau of American Anthropology, page 162, mention the Peabody Museum of Harvard University as having "from the caves of Coahuila in northern Mexico * * * * * long strings for necklaces or bandoleers, made in much the same way as these, but holding in place of pendants the vertebrae of some species of snake." This reference appears to point to a Mexican contact with the classic Basket-maker cul-

ture, and this find to a similar influence on that of the Big Bend Basket Maker.

The fourth, fifth, sixth, and seventh items removed from the pouch were bone implements, three polished awls and one merely a long sliver of deer bone. Items seven, eight, and nine, were a matting pouch or sheath made to hold a flake knife which was in it, and crowded in as well a small fiber packet wrapped with rawhide thong, and which could not be opened without destroying it. This has been allowed to remain intact until it can be X-rayed. Plate XLI, figures 4a, 4b, 4c. Items ten and eleven are similar packages of fiber, contents unknown at present, and twelve is a hard object wrapped in a small sheet of rawhide and tied with a strip of lechugilla leaf, it also still unopened. Article thirteen is a brush of fiber wrapped with a buckskin thong and a fiber cord. It is of a type used all over Mexico today, and similar brushes are made by present-day Mexicans in the United States. Number fourteen is a hank of prepared fiber, fifteen a lump of black paint, sixteen the butt end of a lechugilla leaf such as was used to apply paint, (Plate XLIV, figure 3). Seventeen is a matted packet of grass tied with a strip of lechugilla leaf and containing twelve beans of the juagilla tree or shrub. Items eighteen to twenty-two inclusive were two flint knives, mere unworked flakes, and three scrapers, and twenty-three to twenty-nine were seven buckeyes, the small Mexican variety (*Sapinus*). Item thirty was the prize of the collection. It was made from a joint of a deer's leg hollowed out in the manner of a pipe at the upper end, the narrow cavity cleaned out and gouged through to the bowl in the joint end. The barrel was cut off cleanly. The total length is five inches. Into the marrow cavity is plugged a piece of manganese ore which protrudes slightly in the manner of a pencil point. The instrument can be written with as with a pencil. If a liquid, such as a thick oil, was placed in the bowl of this device, such would feed slowly over the manganese and would write as would a stylograph. It has been suggested by one who should know that this arrangement was a pipe, but this is not a satisfactory solution. The bowl is not charred, and it does have an oily appearance. The manganese would have been superfluous inserted in a pipe stem, and such has the appearance

of having been written with. A similar implement, seven inches in length, and of cruder workmanship than the specimen described above was taken from Cave No. 3. It was found under the drip of the overhang and was in too bad condition to be preserved. In the end of the barrel was wedged a small piece of manganese. Plate XXIX.

Counting the body as one specimen, this burial yielded to the number of fifty articles, which includes a single flint projectile point which was taken from the dust inside the matting-wrapped bundle which had contained the corpse, and which was probably the cause of demise. The burial was probably the richest find ever made in the Shumla district. It was unearthed by John S. Eross, field supervisor of the expedition.

Burial No. 10 was that of a child about three years of age. The ashes surrounding it were moist, there was no basketry, the bones were badly decayed, and only portions of skull, jaw, leg and arm bones were found. The lower jaw differed from all others found in this cave and this may have been a late burial, Lipan or Comanche. In Cave No. 7 another burial was found, the jaw similar to that of burial No. 10, also probably intrusive, and of comparatively late origin.

Cave No. 5 was completely excavated by means of five trenches running from the entrance to the rear wall, these enlarged until all the debris had been explored. Relics were found in all portions of the debris, those worthy of special notice described in the following pages. Hearths of burned rocks, previously mentioned, were found in several places in the cave, as they were in other shelters in the Shumla district, but they did not have the appearance of being the sotol pits mentioned by Pearce and Jackson (*A Prehistoric Rock Shelter in Val Verde County, Texas*, 1933), as found by the latter in a cave in Seminole Cañon. These hearths consisted of far fewer rocks than do the average small burned rock mounds. Surface sites of the vicinity also show few of these mounds in comparison to similar sites further to the westward in Brewster County.

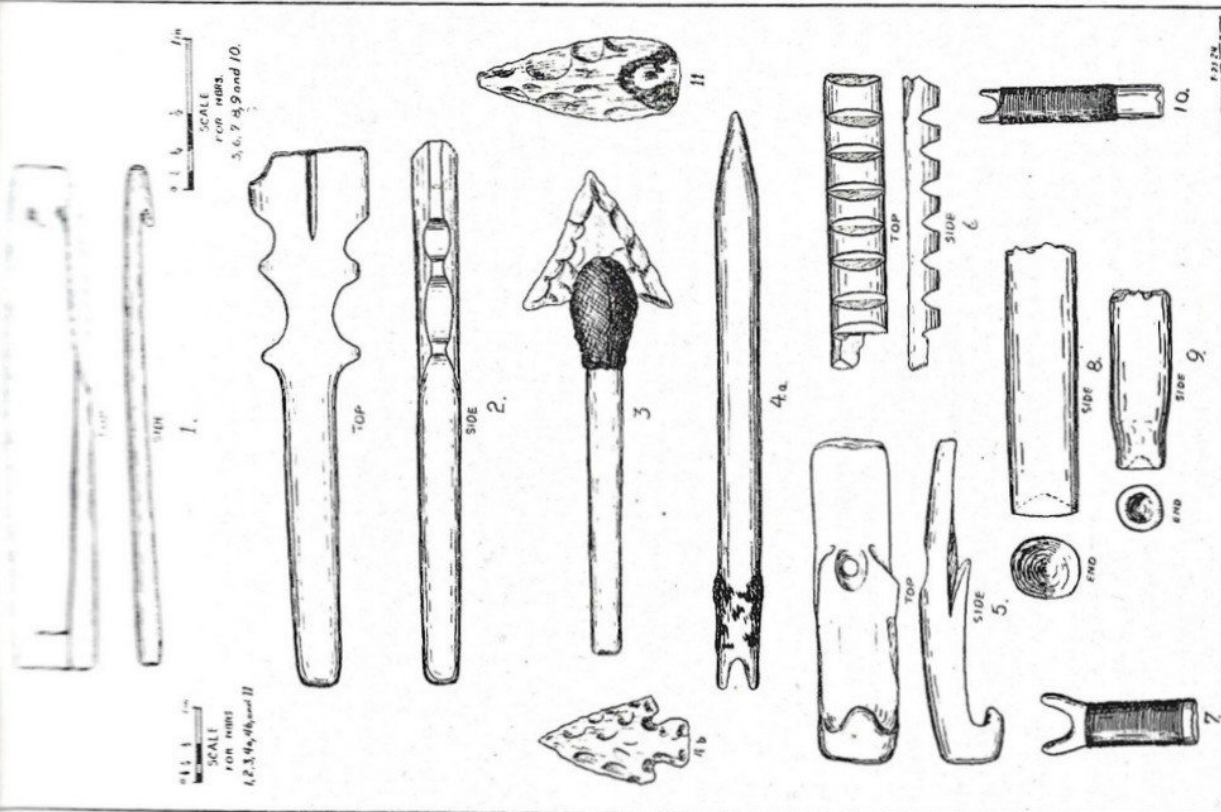
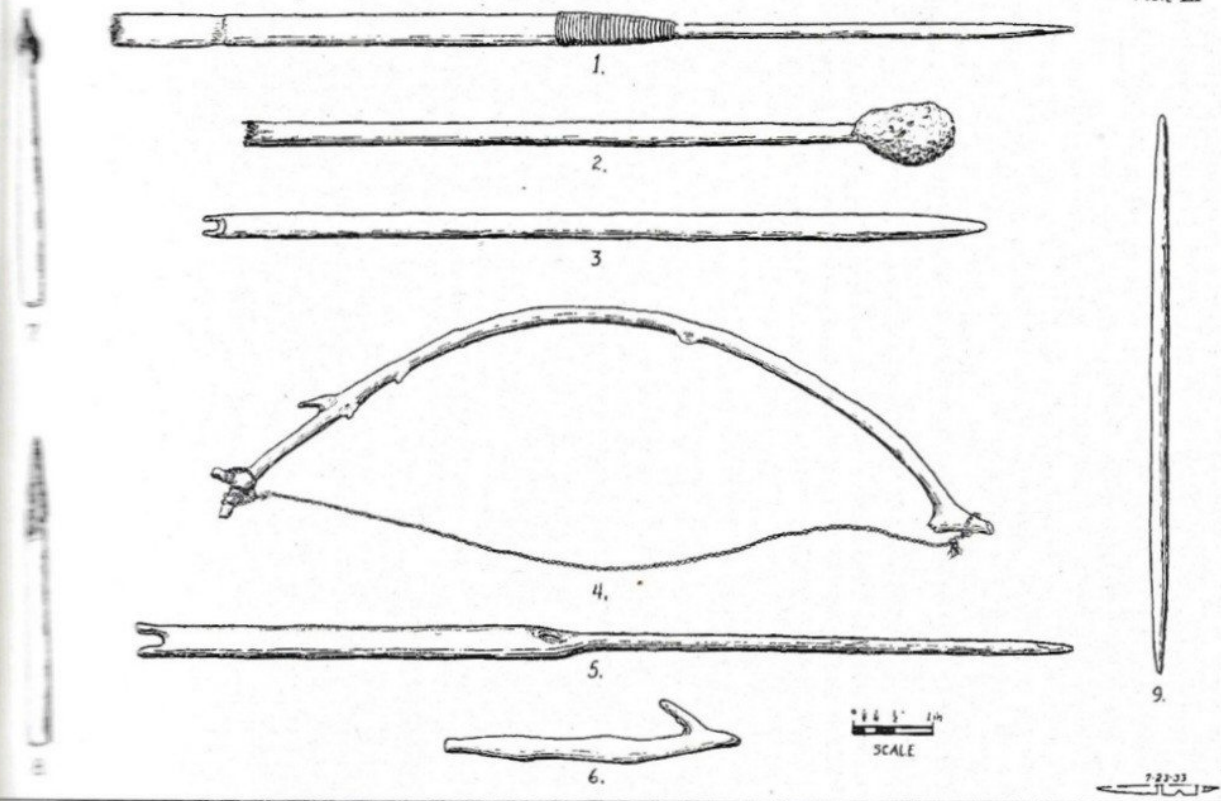


Plate VII. Arrow foreshafts, twig bow, barbed wooden point, and paint sticks (?).
 Plate IX. Parts of atlatls, atlatl javelins and arrows. See pages 26, 27, 28, 29, 30, 34, and 68.

ARROWSHAFTS

No complete arrows were found. Portions of reed shafts, fore andnock ends, were frequently met with. These vary greatly in diameter. They appear to have been made for use with an atlatl specially designed for throwing a light arrow rather than for use with a bow. (See Bulletin No. 2, Southwest Texas Archaeological Society, Witte Memorial Museum). The nocks of the atlatl arrows are deep and flare slightly permitting close fitting with the sear and ready release therefrom. In all cases the joints of the reeds are smoothed down by scraping and abrasion to the diameter of the sections nearest to them. Fore-ends of the shafts are either rounded or tapered and smoothly finished, the foreshafts inserted into the natural cavity of the reed and cemented into place. The fore-ends of the shafts are closely wrapped with sinew to prevent splitting, and, in some cases this wrapping extends well out upon the foreshaft. See Plate VII, figure 1. Close to the nock the diameters of the shafts are reduced by scraping or compression, or both, the nock, itself, allowed to flare slightly. In some cases compression has filled the hollow end of the reed at the nock. Where compression was not used, however, a wooden plug was inserted and cemented fast, the reed-shell and plug cut to form the nock. The reduced portion of the shaft was wound tightly with sinew, this wrapping to prevent splitting and also to retain the feathering, which began very close to the nock, usually not more than an inch therefrom. Bindings and traces of quills (three feathers to the arrow) still remain on some of the Shumla specimens. Arrowshafts west of the Pecos are usually undecorated. One specimen covered with fine line decorations in black paint was taken from a cave in Seminole cañon by Mr. McCarson of Comstock.

Nock-ends of arrowshafts from a cave in Reagan cañon, Brewster county, found by the Woolford-Martin Expedition in 1931, do not have the flaring nocks of the Shumla specimens and the groove is not so deeply sunk. These arrows appear to have been made for use with a bow. Certainly they could not have been used with any atlatl to this time discovered in

the Shumla district. The Reagan cañon shafts are more slender than those from Shumla, that pictured to show the type of nock measuring three-sixteenths of an inch in diameter. See Plate IX, figure 10. This shaft does not show any sign of compression, and the reed cavity is plugged with wood. The Reagan cañon nocks are similar to those pictured by Kidder and Guernsey — (Bulletin 65, Bureau of American Ethnology, page 122, figure 47) and attributed to the Cliff House culture, but the foreshafts from Arizona differ from the Reagan cañon specimens, the former having shoulders which are lacking in the latter. The flaring nock of the Shumla atlatl arrows is pictured on Plate IX, figure 7. One Shumla shaft measures three-eighths of an inch in diameter.

ATLATL ARROW FORESHAFTS.

Wooden foreshafts for atlatl arrows were plentiful. These are usually sharpened at both ends although some few are bluntly shaped where they were inserted in the shafts (Plate VII, figure 9). They vary in length from six and three-eighths to ten inches. Their diameters are usually from three-sixteenths to three-eighths of an inch, an exceptional notched specimen measuring seven-thirty-secondths. They are without the shoulders of the foreshafts of the Cliff House culture of Arizona (Kidder and Guernsey, Bulletin 65, Bureau of American Ethnology, page 122, figure 47) but are identical with finds made by Edgar B. Howard (Archaeological Research in the Guadalupe Mountains, Museum Journal, Volume XXI, Plate XXX, figure 2, Museum of the University of Pennsylvania) which are attributed to a Basket Maker culture. Occasionally, the Shumla foreshafts were painted red, as were some of those of the Cliff House culture before mentioned (Kidder and Guernsey, page 123). Four specimens from Shumla are notched for the reception of flint points, and heads to fit them were screened from the ashes of the Shumla caves. See Plate VII, figure 3.

ATLATL JAVELIN FORESHAFTS

Not so numerous as those for use with arrows, atlatl javelin foreshafts were well represented. One specimen meas-

ures seven and one-half inches in length and a half inch in diameter, notch for the reception of the stone point three-eighths of an inch in depth. The head had been cemented into place with juagilla gum, the remains of which still adheres to the wood. This specimen was found by John S. Eross under three feet of undisturbed layers of ash and fiber, and directly on the stone flooring of Cave No. 5. Near it, almost touching it, was a stone point which might have been once seated in it. Foreshaft and point are pictured as figures 4-a and 4-b on Plate IX. The prize find in this class was made by the writer in the old Shumla Cave under the upper fiber layer (depth about ten inches) and against the rear wall. The point in this specimen is still tightly cemented into place with juagilla gum. It is pictured on Plate IX, as figure 3. A third specimen, broken, but distinctly an atlatl javelin foreshaft, was taken from Cave No. 6. Four were found in Pecos Cave No. 1, and two were excavated from old Shumla Cave. The last mentioned six were all perfect specimens, those from the Pecos slightly shorter than those from the Rio Grande. A javelin point of leaf shape was found in the lowest man-caused layer in Cave No. 1, depth four feet and six inches. The gum with which this was cemented into place still adheres to the stone. It is depicted on Plate IX, as figure 2. The writer can find no trace of lashings having been used to hold the cemented points in place. Apparently the cement only was used, this balled thickly around stone and wood at their junction*. The juagilla also spelled **huajilla** and **guagilla**, and pronounced wa-hee-ya, another Mexican name **tenaza**, and called by the Mexicans along the Rio Grande the **Mesquite de San Juan**, is the **Habardia brevifolia** of Small, and the **Pithecollobium brevifolium** of Benth. It is a small species of tree or shrub of which existing specimens still screen some Shumla cave entrances. Gum exudes from the bark. This dries very rapidly and becomes almost stone-like in hardness. Gathered and stored lumps of this resin were found in several of the caves. Age darkens it from its original clear appearance to dark brown and black. Some writers have miscalled it "asphalt."

*Jesse L. Nusbaum, (A Basket-maker cave in Kane County, Utah, page 127) depicts a hafted knife, the blade attached to the handle with a bulky wad of pitch or gum. It is attributed

to a Basket-maker culture. Dr. Daniel de la Barbolla, National Museum of Mexico, after examining the Shumla specimen, stated that he had not seen similarly hafted specimens from his country.

DISTAL END OF AN ATLATL AND A DETACHABLE ATLATL SEAR OR SPUR

Apart from a distal end of an atlatl found in a cave near Shumla by Mr. Guy Skiles, of Langtry, this described in Bulletin 2, Southwest Texas Archaeological Society, Witte Memorial Museum, another specimen was unearthed by the expedition. This was taken from Cave No. 1 by John S. Eross. It is pictured on Plate IX, as figure 1. It is of wood, probably of ash, and about seven inches in length, one inch in breadth (measured where it was cut, not broken, from the balance of the weapon), and one quarter of an inch thick. The groove has a flat floor approximately one-sixteenth of an inch below the outer rim, and this cuts under the sides of the frame so that the feathering would aid in holding the arrow in place. The sear, or spur, rises three-sixteenths of an inch above the floor of the groove and fits the nock of an atlatl arrow, or, the cup-like butt of the typical atlatl javelin. See Plate IX, figure 7, and also figures 8 and 9. Figure 9 depicts a javelin butt from Cave No. 5, Shumla, and figure 8 one from a cave on Pommel Peak, Chisos Mountains, Brewster County, the latter found by the Woolford-Martin Expedition in 1931. These differ greatly in forms of depression.

A detachable device which would convert any stick of appropriate size and shape into an atlatl was found by J. Walker Davenport, expedition artist, in Cave No. 5, Shumla, depth below undisturbed layers of fiber and ash two feet and one inch. See Plate IX, figure 5. This specimen is two and one-eighth inches in length and a half inch wide. It is of either bone or deer antler, probably the latter. It is pierced to permit attachment to the shaft of the atlatl, and is grooved at a slightly downward angle along its sides to protect the lashings from contact with javelin or arrow. This specimen could also have been used with flarenocked arrow or cup-nocked javelin. While probably the first specimen of its kind to be found in Texas, this device has been found further south,

in old Mexico, and Peabody and Farabee (Peabody Museum Papers' volume III, number 2, Plate 20) found a bone spear or spur in a mound in Mississippi. The discovery of the Shumla specimen adds one more evidence to the many which indicate Mexican influence on the Big Bend Basket Maker culture.

TWO PROXIMAL ENDS OF ATLATLS

Two proximal (handle) ends of atlatls were taken from the Shumla caves. One is of the broad heavy type used for casting javelins or spears, as differentiated from the type which speeded light arrows. This specimen was taken by the writer from the surface fiber layer of Cave No. 6. It is notched at the sides for the reception of the first and second fingers, the lower end of the handle slender and cylindrical, and of small diameter, and easily held securely by the thumb, third, and fourth fingers. It was probably used without finger loops. See Plate IX, figure 2. Another specimen was taken from old Shumla Cave. This represents the light type which cast arrows rather than spears. It is nine and a half inches in length and eleven-sixteenths of an inch in width. Four and three-eighths inches from the butt begin two notches for the reception of the fingers, these three-quarters of an inch in breadth and three-thirty-seconds of an inch in depth. There are no signs of finger loops having been attached.

NOTCHED WOOD FRAGMENT

This is pictured by Plate IX, figure 6. It is a fragment of ash (?) wood, polished, and carefully notched at regular intervals. It is evidently a fragment of the under side of a very narrow atlatl of the light arrow type, the notching not unlike that of the atlatl described in Bulletin 2. before mentioned.

"RABBIT STICKS" OR GROOVED CLUBS

"Rabbit sticks," or grooved clubs, despite several offered theories, are still very much of a mystery, more so than ever when those found in the Shumla caves are considered. Five complete specimens were found there, and fifteen fragments. Four are depicted by Plates XXX and XLIII, figure 6. The

longest depicted specimen on Plate XXX measures twelve inches. In its sides are incised three separated clusters of grooves, two of three each and one of four with a portion of an unfinished fifth. The second depicted specimen has a length of nine inches and has two sets of three grooves on each side. The third depicted on Plate XXX is without grooves. The writer believes the club depicted by Plate XLIII, figure 6, to be unique. This specimen has a fin protruding from its convex edge, and has three sets of grooves, four to the cluster. The proximal end is roughened to insure firm grip, and the distal end and edge of the fin are badly battered and worn. All complete specimens found have the roughened grips and battered and worn distal ends. All have been shortened by hard use, not broken off and reshaped as one writer has stated, and the manner in which they were used caused the distal ends to retain their original rounded forms as long as anything remained of them. One specimen has been worn down to a length of four inches. It is not broken, and was reduced in length by the use to which it was put. In its present size it would not have served as a rabbit stick, nor would it have served to ward off thrown spears or arrows, yet, in its shortened condition it was still being used at the time it was discarded or lost. Had these clubs been used as rabbit sticks in the very rocky Shumla district they would display bruises from contact with stones and would be battered elsewhere than at the ends. Had they been used to ward off missiles their ends would not have worn down. Whatever their utility was, a blow was struck with them, either a downward sweep as with a saber the end only making contact, or a thrusting blow as with a rapier, affecting only the distal extremity. The carrying of such clubs by men armed with the atlatl might not indicate a weapon of defense, but one of offense for use at close quarters or to finish off enemies or animals merely wounded by the atlatl javelin.

Kidder and Guernsey, in their "Basket-Maker Caves of Northeastern Arizona," Peabody Museum, page 89, state-- "The sculptures of Chichen Itza frequently depict these clubs, usually in the hands of warriors who also carry atlatls and atlatl spears. One is figured most realistically on the sculptured top of an altar in the outer chamber or vestibule of the Temple of the Tigers, where it is shown in the left hand of

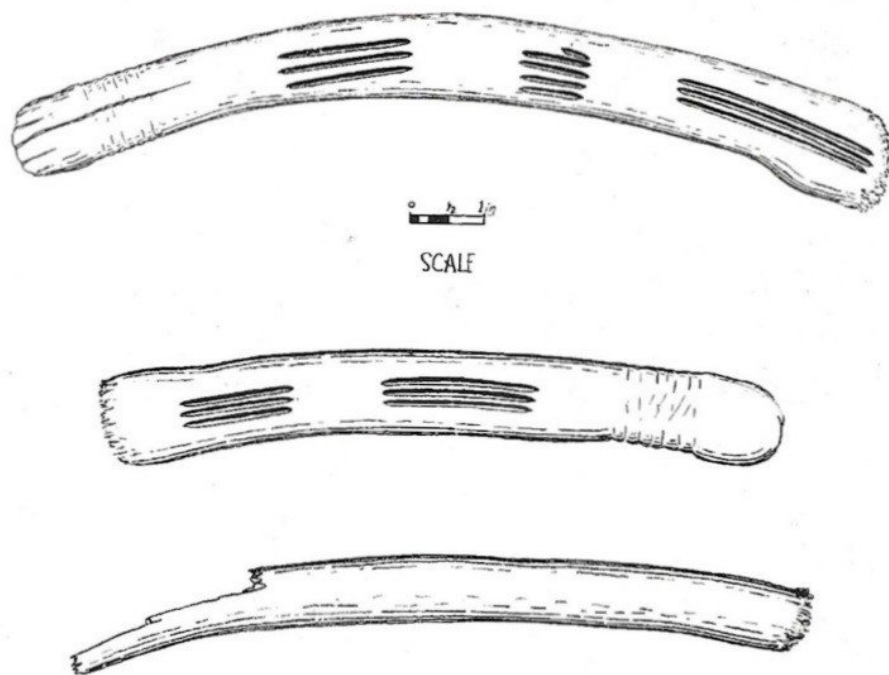


Plate XXX. "Rabbit sticks", or grooved clubs. See page 30.

a warrior, who bears as well an atlatl and sheaf of spears." On the same page appears—"In company with all grooved clubs noted either atlatls or some adjunct of the atlatl were found. The significance of this is two-fold; first, that it aids in establishing the identity of the Laguna pit-shrine and the Lava cave specimens as Basket-maker; second, that it shows these clubs to be a distinct type used by a people who also used the atlatl."

One complete specimen from Old Shumla cave had been completely covered with skin. Unfortunately, this find was made in a damp portion of the cave, and, the covering had decayed, the wood itself soft and spongy. The specimen absorbed a great quantity of shellac, and it has probably been saved.

POISONED POINTS (?) OR CEMENT STICKS (?)

Two points of wood which had been dipped in a black, pitchy substance were found in caves No. 3, and No. 6. On

one the material is thick and hard, while on the other the color merely shows. These points are slightly over four inches in length and appear to be short foreshafts with blunt bases. There is the probability that they were used as cement sticks in applying jagilla or other gums to articles in process of manufacture, but, they appear to have been dipped but once, not smeared as would have been the case if so used. In appearance they are much like the poisoned foreshafts of some tribes of the upper Amazon which were envenomed by dipping. Such poisoned points were carried in reed tubes and were inserted in the shaft just before being used. The poisoned foreshafts of the Amazon country are usually quite short, the unpoisoned foreshafts quite long. See Plate VII, figures 7 and 8.

TONGUE AND GROOVE FORESHAFT PARTS AND POINTS

Apparently undescribed as having been previously found in Texas are curious tongued and grooved points and parts of foreshafts from the various Shumla caves. Some of these are depicted by Plate X. Figure 1, is a rough atlatl javelin point which would have fitted into the normal foreshaft used with a stone point. Figure 7 is a bunt point which was evidently inserted in the natural hollow of a cane javelin. This may have had a sharp point originally which was blunted by constant use, the end having the appearance of having often come in contact with some substance with consequent bruising of the wood fiber. Figure 2 is a short, thick shaft with groove for the reception of a stone point, and a tongue which would have fitted into the groove in the average atlatl javelin foreshaft. Such a device might have been used to lengthen a too-short foreshaft. Figures 3 and 6 are broken, but show the tongue and their probable use. Figures 4 and 5 are complete and perfect, undoubtedly used to lengthen arrow-foreshafts. The points depicted in these specimens were not in them when found, but were sieved from the ashes in the same caves. Figures 2, 4 and 5 were unused, points never having been attached, so it is not known if binding or cementing was practiced in connection with the small stone points.

Plate X, figure 2, mentioned above is practically dupli-

cated by an illustration in Jesse L. Nusbaum's "A Basket-maker Cave in Kane County, Utah," page 111, figure 18-a.

BARBED WOODEN POINTS

Harpoon shaped points made from ebony or other hard woods native to the Shumla district were found. Plate VII, figure 6, depicts a specimen from Cave No. 5. The shaft is a debarked twig, the barb a small branch growing therefrom. The entire implement was thinned and shaped with a stone scraper or knife, and was fire-hardened. A specimen which had had two barbs was observed in the hands of a local collector. This was not fire-hardened. Such points have the base end of the shaft cylindrical for insertion in a reed shaft. Length of the depicted specimen is three and three-quarters inches.

SHELL IMPLEMENTS, ORNAMENTS, AND REFUSE

One of the important articles of diet of the Shumla cave dweller was the land snail, two varieties of which were noted

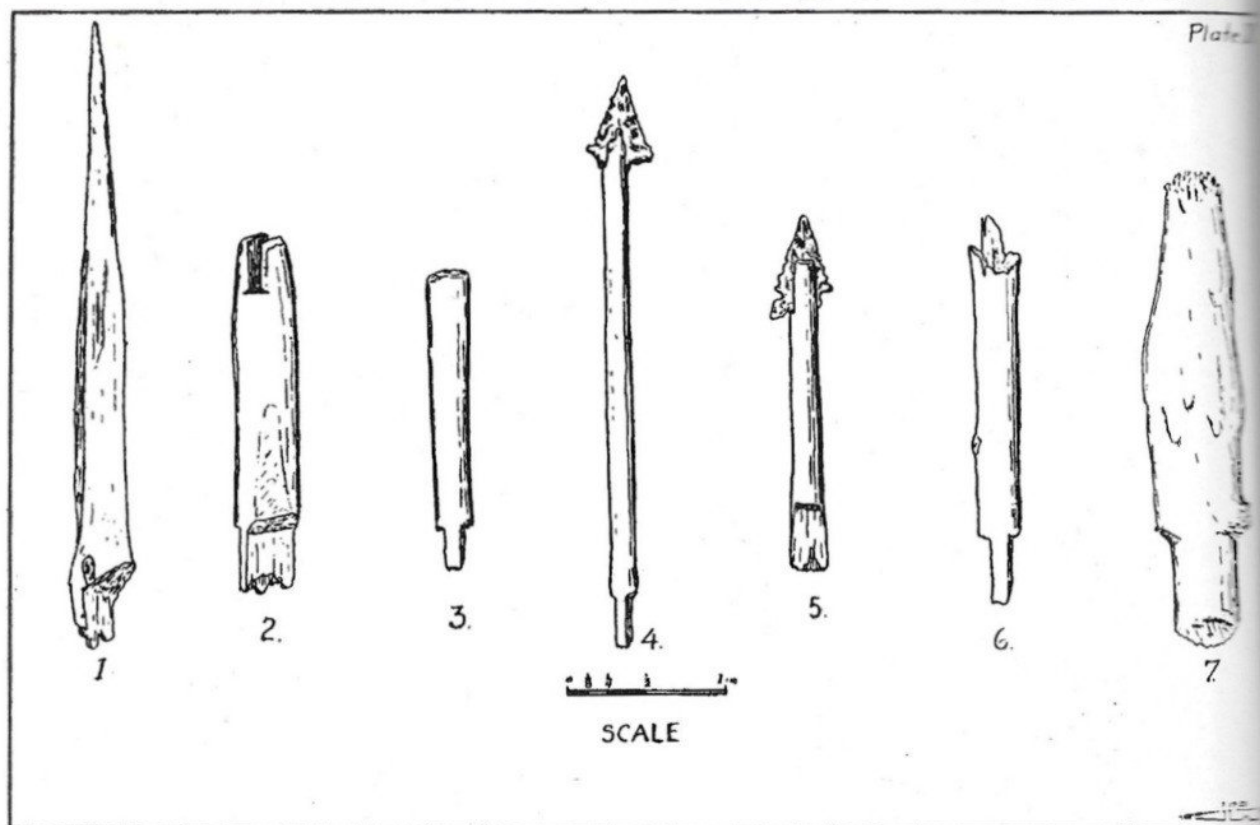


Plate X. Tongue and groove wooden points and parts of foreshafts. See page 33.

in quantities in the refuse. As indicated by their remains, many of these were consumed uncooked, others roasted in the fires. But little use was made of the shells. In fact, none that had been used for any purpose were found by the expedition although some were seen that had been taken from caves in the vicinity which had been painted red, others black, while some had fineline decorations in the form of chevrons. The Woolford-Martin Expedition, in 1931, removed from old Shumla cave a short string of these shells, five specimens strung on a strip of lechugilla leaf. The shells had not been drilled, the holes therein crudely broken through.

Mussel shells (*Unio* sp.) were present but far from plentiful, none affected by contact with fire. Very little use had been made of these. A single small pendant of this material was taken from Cave No. 6 (See Plate XXII, figure 1); a scraper (Plate XXIV, figure 2) and a small scoop or spoon (Plate XXIV, figure 3) from old Shumla cave. The scraper measures three by two and seven-eighths inches. The scoop is notched at the sides for the attaching of a haft, and is four by two inches. Both specimens are much scratched and worn.

On the coastal section of Texas, on sites historically Coahuiltecan (or, Pakawan according to some authorities) in Nueces county, land snail shells were found by the writer in immense quantities. They were also found on Lipan sites in the same vicinity, but were absent from the Karankawan sites on the coast north of the Nueces river and its bays.

BONE IMPLEMENTS

Almost two hundred finely polished bone implements were taken from the Shumla caves, about half of which are perfect and undamaged. The handles of some of these are decorated with incised lines. Plate VIII depicts four of the commonest types, three of them with engraved handles. A very few of these should be classified as weapons rather than implements. Some were probably used in the making of fiber sandals, a tool of this kind necessary in inserting the final warpways strands in some types of footwear. None of the depicted types show the scratches of hard use. Pieces of rawhide were found which were pierced with oval holes such as might have been made with such implements. One speci-

Plate VIII

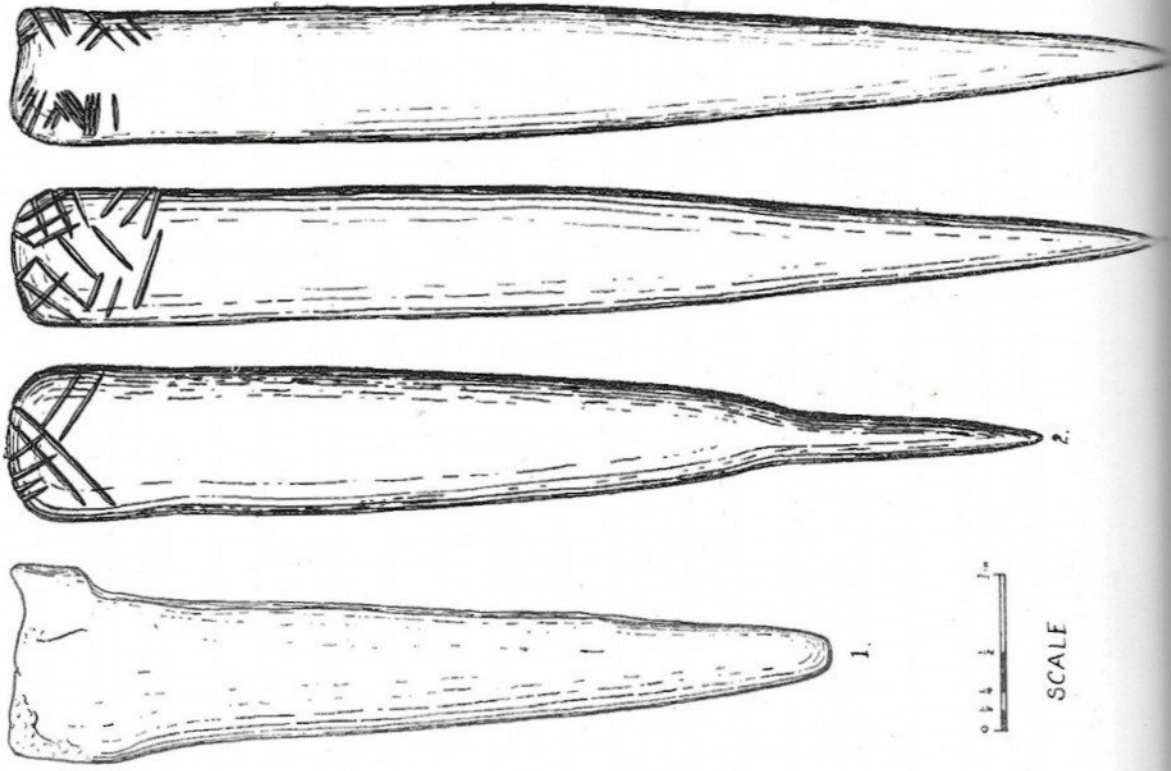


Plate XXIV

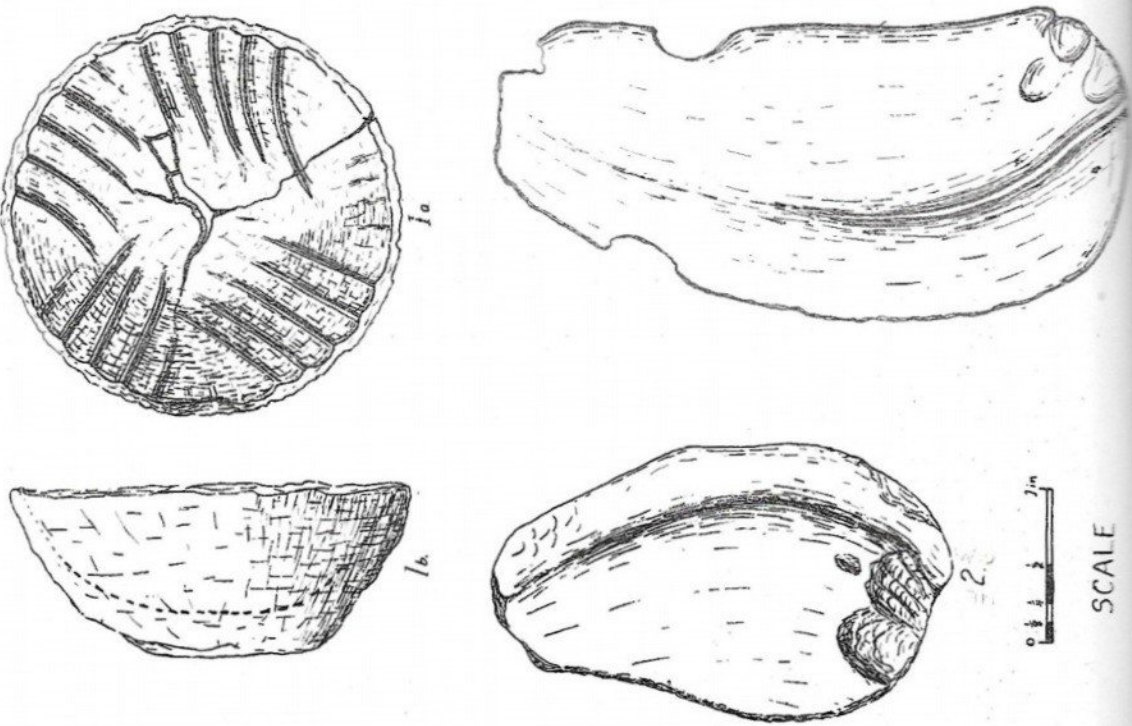


Plate VIII. Polished bone implements. See page 35.

Plate XXIV. Upper, portion of mummified cactus showing impressions of teeth. See page 78. Lower, shell implements. See page 35.

men found retained remnants of animal skin which had once covered its handle. Small deer-bone awls and those made from the jawbone of the gar, from ribs of the buffalo fish, and from fins of the catfish were very plentiful. Gouges of bone were not found. Deer-bone "flakers" of fine and highly specialised type, made from the joint of the ulna, with "screw driver shaped" working end, were common in Caves No. 3 and No. 5. Ten perfect specimens of this type were taken from Cave No. 3 alone, and many that had been broken. Highly specialised needles used in the knitting of nets, these described under another heading, were of deer bone.

A single long bone of a deer which had been drilled through from side to side at the middle of its length was taken from Old Shumla Cave. A bone with numerous notches along its edge, possibly a tally was found. Deer scapulae scoops have been mentioned under another heading.

BEADS AND NECKLACES

Beads were found in several of the caves. One hundred and eighteen tubular sections of bones that had formed one string were taken from Pecos Cave No. 1. All but two are merely roughly sawed-apart sections of long bones of animals, a half to two inches in length, the exceptions having rounded and polished ends. Five similar beads were taken from Cave No. 1 on the Rio Grande. See Plate XXII, figure 2. Two small beads of the same type but made from the bones of birds were taken from Old Shumla cave, and a similar specimen one inch in length, with fourteen incised lines encircling it, was found in the same cave. A portion of the last mentioned specimen is depicted by Plate XXII, figure 8. In the old Shumla cave, in 1931, the Woolford-Martin Expedition found a piece of fiber strung with five land-snail shells (*Bulimus* sp.), evidently a portion of a necklace. Plate XXII, figure 7-a and 7-b, depicts a single shell bead found on a surface site close to Cave No. 7. The material of which it is made appears to be from a sea shell, possibly the quahaug or hard clam, not the fresh water mussel.

Two necklaces of fiber cord embroidered with the vertebrae of rattlesnakes were taken from a basketry pouch in Cave No. 5, described elsewhere in this work. See Plate

XXXIX, figure 6, for technique. A single very fragile necklace of weed stalks was found. Tiny branches protruded from the stalks, and these had snake vertebrae threaded upon them and cemented into place. Due to its fragility many of the vertebrae had fallen from this specimen.

With an infant burial in Pecos Cave No. 1, was a necklace of small olivella shells, and with it a pendant composed of

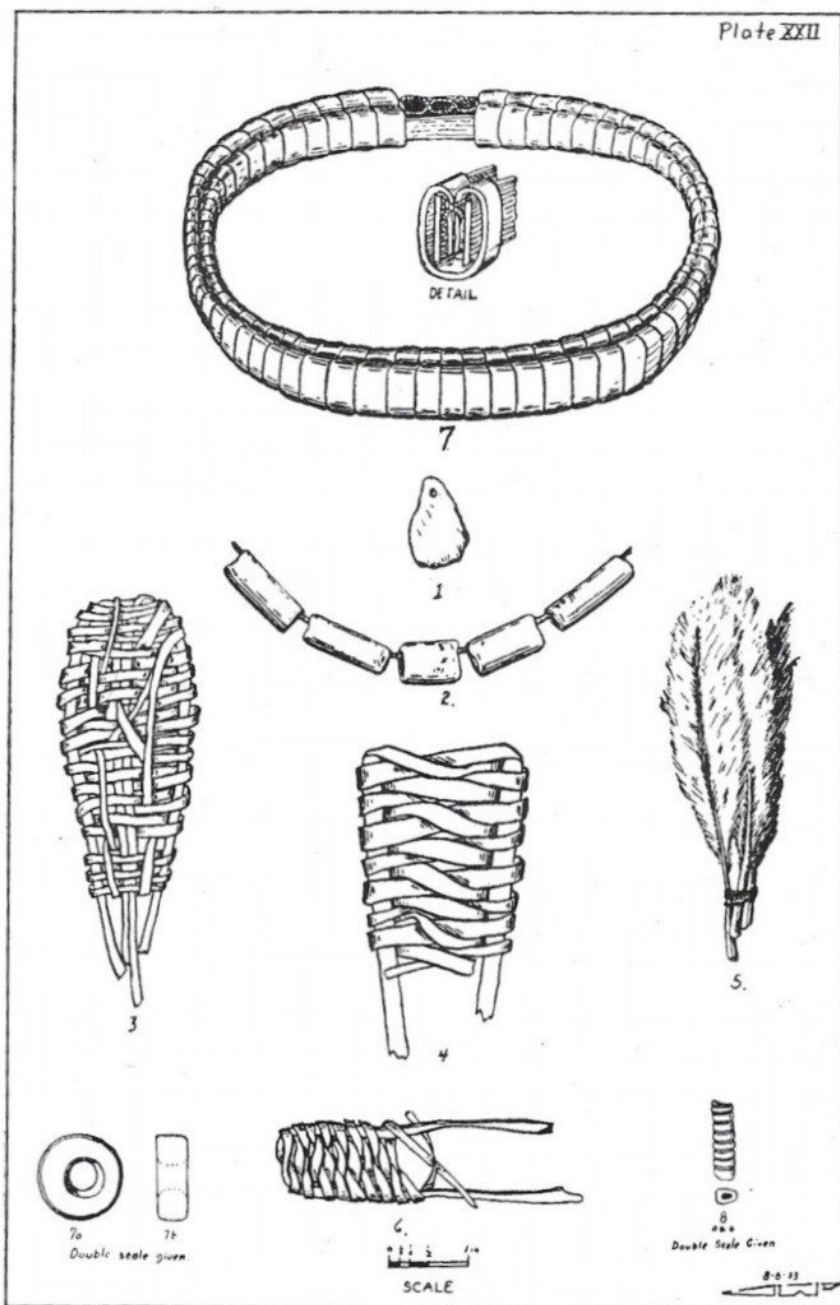


Plate XXII. Bracelet. See page 56. Beads, See page 37. Plume and plume foundations. See page 69.

two incisor teeth of a large species of squirrel. A slender fiber cord about three inches in length had its two ends cemented into the nerve cavities of the teeth. This cord was then doubled the teeth hanging pendant therefrom.

DEER SCAPULAE

Two scapulae of deer, which had been used as scoops, were taken from the caves. Both of these show the wear occasioned by their use. Plate XLIII, figure 5, depicts two pairs of deer scapulae, each pair tied together, the pairs tied to each other. This could have served but one purpose, that of a rattle. When shaken this device gives off a loud, resonant, rattling sound.

IMPLEMENTS OF DEER ANTLER

Several flaking tools of this material were found, these the tips of tines worn by flaking.

Two main trunks of deer antler, both worn smooth at one end as though having been used as pestles, the opposing ends hollowed out as though to receive the proximal ends of bone implements, were taken from two of the caves. In both cases the ends with the cavities are charred. Mr. Edwin F. Coffin reported a single similar object as found in his Bee cañon cave, in Brewster county. As is the case with the Shumla specimens the holed end of the antler is charred, the unholed end worn smooth. It would appear likely, that apart from use as pestles, these implements were used to hold some object that was thrust into the fire and became hot enough to destroy the handle. Reeds were found in the caves that had been pierced by a heated implement. See Plate XLIII, figure 7.

A single basal portion of an antler, two inches in length, one and one-half inches in diameter, was taken from Cave No. 2. The lower end had been used as a pestle, the upper end showing the manner in which it was separated from the balance of the antler. The trunk had been completely girdled to the depth of a quarter of an inch by cutting with a stone knife and then broken.

A detachable sear for use in forming an atlatl is probably of deer antler. See Plate IX, figure 5, and description

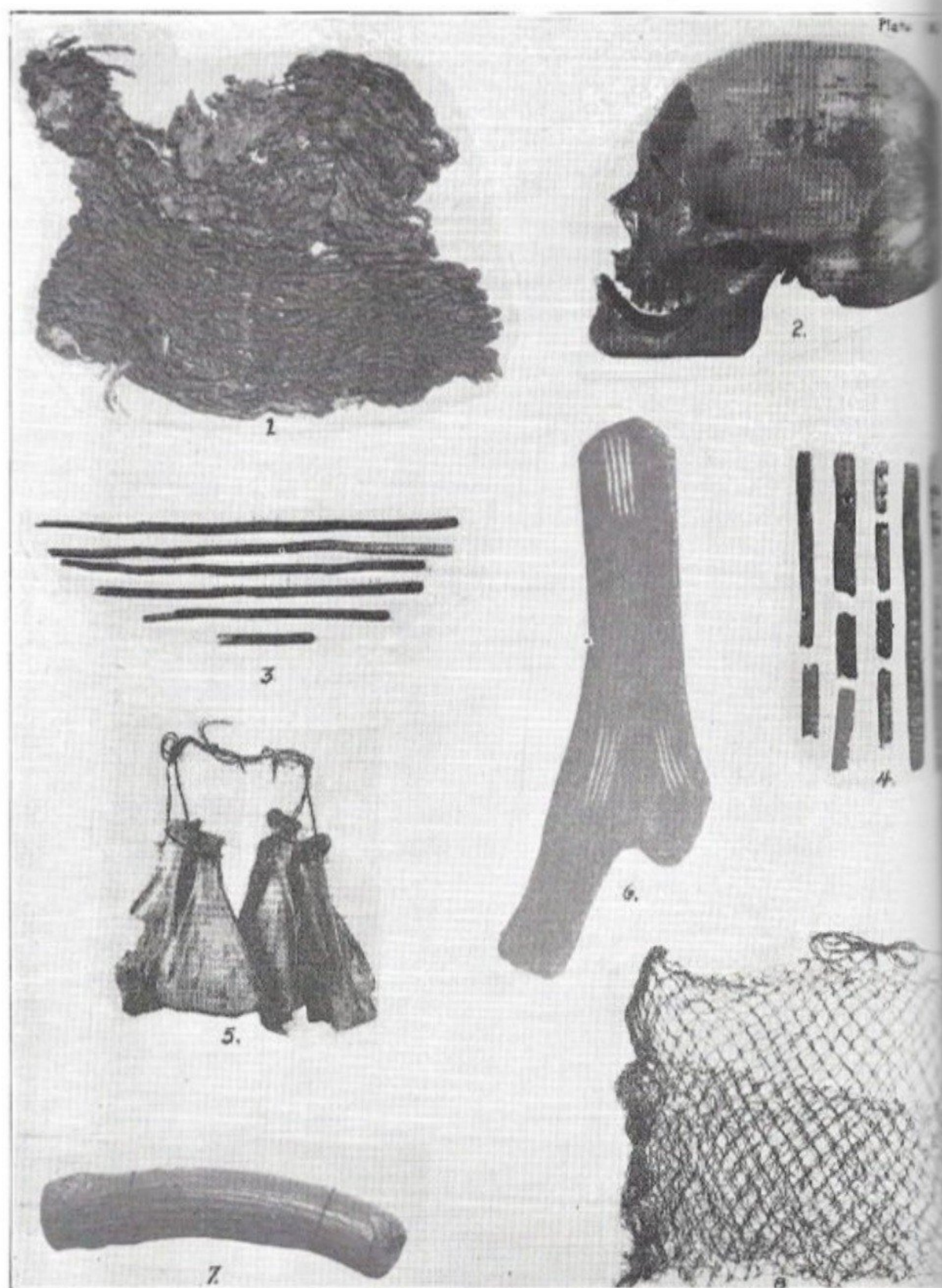


Plate XLIII. Fig. 1. Fur-cloth and fiber-cloth twined mat, see page 46; fig. 2. Skull depicting lack of lower molars, see page 79; Figs. 3 and 4, fire drills and hearths, see page 65; Fig. 5, rattle of deer scapulae, see page 39; Fig. 6 rare form of grooved club, see page 30; Fig. 7, implement of deer antler, see page 39; Fig. 8, net bag, see page 53.

under another heading. From old Shumla cave was taken an implement of deer antler of problematic use. A six inch length of curved tine had been split lengthways. One half had been hollowed out by scraping. The ends had been smoothed down. All portions show the polish of much use. Length, not considering the curve, is exactly six inches, breadth approximately fifteen-sixteenths of an inch its entire length.

CRADLES

Cradles were found with three infant burials. Two of these were in Cave No. 5 on the Rio Grande, one in Cave No. 1 on the Pecos. The two from Cave No. 5 are depicted by Plate XXXVI, PLATE LXIV, figure 7, and Plate V. Plate V, shows one cradle in place resting on the matting container of a mummified infant. Plate XXXVI, depicts the same cradle in detail. The frame is a naturally forked branch of a tree. This is crossed by two pieces of split sotol stalk tied into position with string. Twig rods form the bed, these twined into place with cordage. Three loops are fastened to the

Plate XXXVI

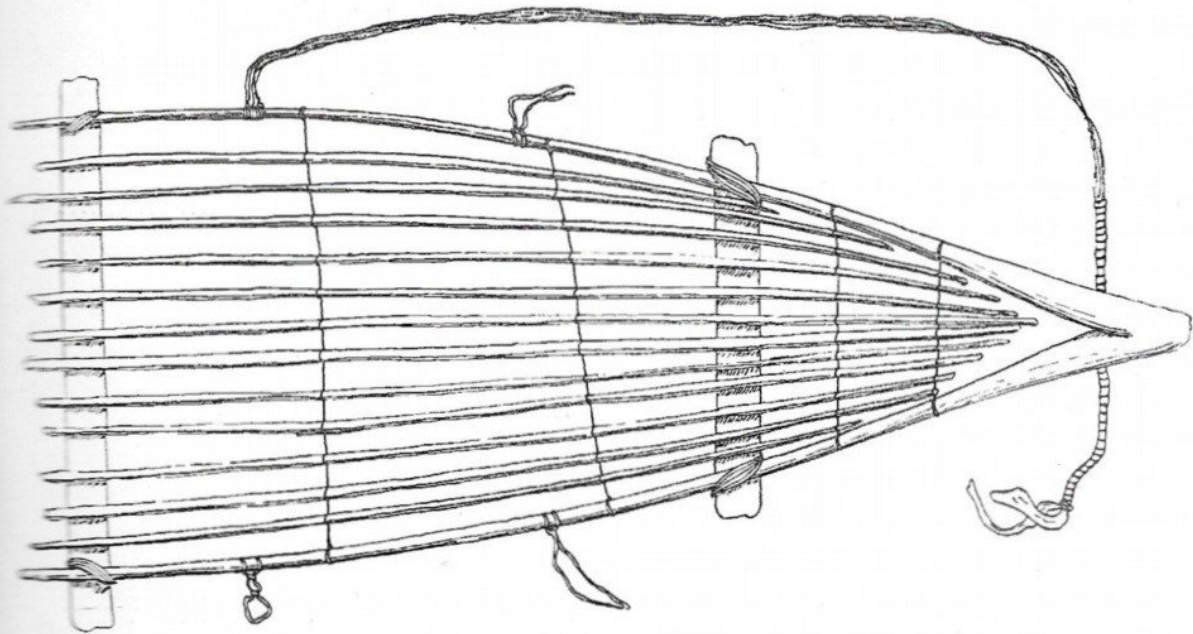


Plate XXXVI. Cradle with cord. See page 41.

frame. On the side of the frame opposite the lowest loop is the cord, or cluster of cords with which the infant was held in place when in use. This cord passed over the child's legs, through the loop opposite to it, crossed to that on the other side of the frame, passed back across the body, through the third loop, and again crossed the body and was tied to the frame above the upper cross piece. The bodies with these cradles were mummified. Around each was wrapped a small robe of fur-cord cloth supplemented with an outer wrapping of skin with the fur still on it. These wrappings had evidently been used as covering for the infant in life, and had formed the padding which protected their little bodies from contact with the frame of the cradle. The cradle depicted by Plate XLIV, figure 7, is less elaborate. The frame of this consists of two branches tied together in "V" shape, these held apart by three split sotol stalks tied to the frame with cordage. Four loops are attached to this frame, and the cord used in tying the infant to it passed through these in the same manner as that on the first described cradle. The third cradle found (not depicted) was of this type. With each cradle was the length of cord which had been used to fasten the cradle to the mother, or to hang it to some inanimate object. With the cradle depicted by Plate XXXVI, attached to the frame by a cord, was a rawhide pendant, evidently an infant's toy. The tiecord with this cradle is probably unique, its technique depicted by Plate XXXIX, figure 4. All of the cradles found had been purposely broken before interment. These cradles are unlike any attributed to any Basket Maker culture by any writer to date.

TYING AND BINDING MATERIALS, LEAF STRIPS, GRASS, AND RAWHIDE.

Strips of lechugilla leaves formed the principal tying material supplemented by sotol strips and grass. Thousands of knotted rings of these materials that had held together gathered sheaves of raw material were found in the fiber layers of all of the caves. Single strips of lechugilla leaf, on each a series of loosely tied single knots, depict the method of transporting the leaves of the prickly pear. Single leaves were carried by means of a strip thrust through a hole in

the leaf, and tied with a single knot. Sometimes several leaves were pierced and so strung, a single knot tied at each leaf to keep them slightly apart and prevent them from bruising each other. The principal tycords of the sandals are lechugilla strips, only the type depicted by Plate XVIII, figure 2, having tyes of twisted cord, and only one specimen, a hide sandal, having rawhide cord.

Twisted cordage was very plentiful, mostly made from the fiber of the sotol, some from that of the lechugilla, some from an apocynum. No cordage made from the yucca fiber has been recognized. Twisted cordage of extremely fine diameter, two plies, each consisting of two strands of fiber, were found. The twists are both clockwise, and anti-clockwise, the former predominating in number in specimens located.

Short twisted cords were occasionally made from a single lechugilla or sotol leaf, the string tapering off in thickness with the narrowing of the leaf toward its pointed end. An incompletely made specimen was found whereof only part of the leaf had been made into cord, the balance still retaining its natural form. Rawhide thongs were occasionally used in binding, that is, in tying objects which were to be permanently held or bound. Such tyes were found on a hafted scraper, on a brush, on several burden carriers, two necklaces, and, in one case on a small package of fiber which encloses a still unknown object, it not as yet having been opened.

A small volume could be written on the various forms of cordage, and its uses as portrayed by the Shumla cave finds. See other headings as to unusual specimens from these shelters.

A SKIRT OF FIBER CORD.

A skirt made of fiber cordage was found in the surface fiber layer of Cave No. 5. It is depicted by figure 5, Plate XLIV. It consists of a waist cord over which cords have been hung, these twined together. Such portions of the fringe as are not frayed and worn at the ends denote that the original length of the skirt was about eight inches. Portions of the waist cord still remain on the specimen. Judging by the

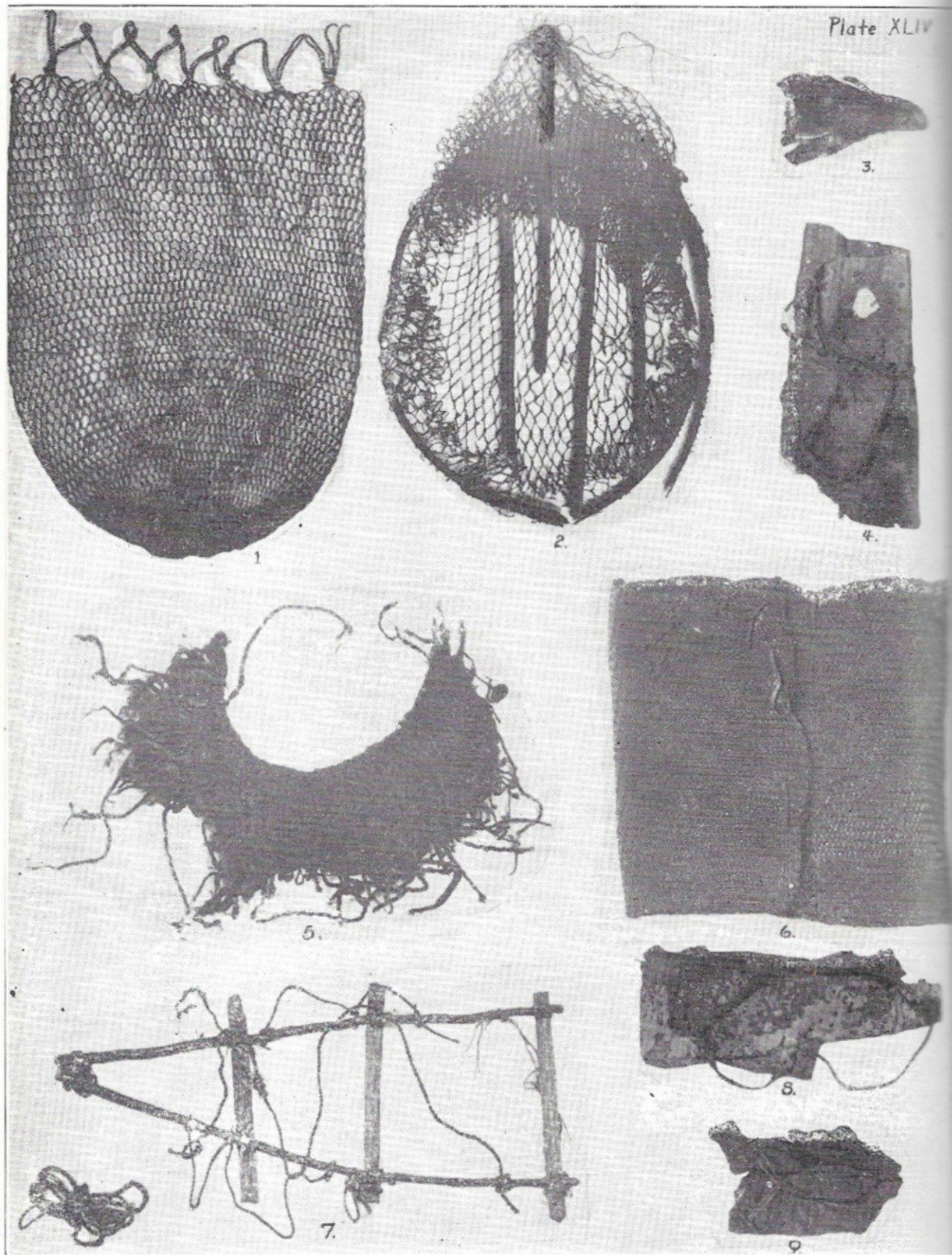


Plate XLIV. Fig. 1, Coil work bag from Cave 1. See page 48; Fig. 2, fish net, see page 53; Fig. 3, butt of lechugilla leaf used in painting; Fig. 4, a basketry pouch from grave in Cave 5. see page 22; Fig. 7, a cradle from an infant's grave in Cave 5, see page 41; Fig. 5, fiber cord skirt, see page 43; Figs. 4, 8, and 9, rawhide sandals, see page 73.

angle of the waist cord, and the curve of the skirt itself, said garment was worn below the abdomen, not at the waist-line, the cord passing over the hips and around the back. This skirt is almost identical with similar garments from Arizona and the vicinity of El Paso, one depicted by Kidder and Guernsey in their "Basket-maker Caves of Northeastern Arizona", 1921, Plate 16, figure c; the other by Frank H. H. Roberts, Jr., in his "Recent Archeological Developments in the Vicinity of El Paso, Texas", Volume 81, No. 7, Plate 4, Smithsonian Miscellaneous Collections. The Arizona specimen is classified as "Basket-maker", the Texas one unattributed as yet.

CORD WRAPPED FIBER CORDAGE

A very unusual cordage was found with a cradle in a burial in Cave No. 5. This consists of a loosely twisted fiber string around which is tightly coiled or spiraled another cord of very soft fiber, possibly an apocynum, very tightly twisted. It was with this line that the cradle was hung or fastened to the back of the mother. It is doubtful if the external wrapping lent any strength to the central string or core, and it was probably added as a padding to reduce the cut of the slender string into the flesh. See Plate XXXIX, figure 4.

HAIR STRING.

Hair string was found with several burials in Cave No. 5, with a burial in Cave No. 1, and odd pieces in several other Shumla caves. None of human hair was recognized. Apparently the woolly hair of the bison (**Bos Americanus**) was used. A large folded robe or blanket of hair string cloth was found with a burial in Cave No. 5, but it was so badly decayed that it powdered at a touch and could not be removed, nor be cleaned of dust so that it could be photographed. Even its quality could not be judged clearly, but it appeared to be of the same hair as perfectly preserved hair string taken from another burial in the same cave and from still another burial in Cave No. 1. Apparently, there were two types of hair string made near Shumla, one a loosely twisted type in which the hair ends were compacted in-

to the twists so that the whole had a smooth appearance; the other more tightly twisted and with the hair ends protruding and giving the strings a furry exterior. Both consist of numerous strands (seven to ten in those counted), thick and thin strands being twisted together indiscriminately. A piece at hand as this is written has four thick and three thin cords composing its body. Plate XXXIX, figure 1.

FEATHER STRING

While all of the Shumla caves yielded fur-wrapped string and cloth, only one produced feather string, this of a variety differing in technique from both that of the Basket Makers and Cliff Dwellers of Arizona, but approaching that of the former. (Technique of the Basket Maker and Cliff Dweller feather string referred to is as described by Kidder and Guernsey, "Archaeological Explorations in Arizona," page 174). The Shumla string has for foundation two cords of sotol fiber twisted loosely together. Around the single string so formed are wrapped narrow strips of the skins of birds. The manner of wrapping is such that all of the feathers lie in one direction. At intervals the strips are fastened by wrappings of very fine fiber or slender strips of quill. The winding strips are very closely and carefully wrapped and the binding of fiber and quill completely concealed. This string has a very even and pleasing appearance. None was found that had been woven into cloth. All specimens found were used in tying together the mats that encased a burial in Cave No. 5. See Plate XXXIX, figure 2.

FUR STRING AND CLOTH

Fur string was found in all of the Shumla caves, single cords of two strands composed of sotol or lechugilla fiber, wrapped with narrow strips of skin, some with the fur still remaining. Fur-cloth was found with many of the burials encountered, but usually in unpreservable condition. A complete robe of fur-cloth in poor condition was removed from a burial in Cave No. 5, and a large portion of a mat, partly of fur-cloth, partly of fiber-cloth, was taken from below the same body. See Plate XLIII, figure 1. This mat measures nineteen by twenty-two inches. The twining, which holds the fur strings together, is poorly executed and of thick, loosely

twisted rope, twined irregularly at about one inch intervals.

From a burial in Cave No. 1, was taken the remains of a fur-cloth blanket or robe the strings forming which lacked the sotol cord foundation. They were composed of two strands of skin twisted together. The twining cords in this case were of apocynum instead of the usual sotol. See Plate XXXIX, figure 5.

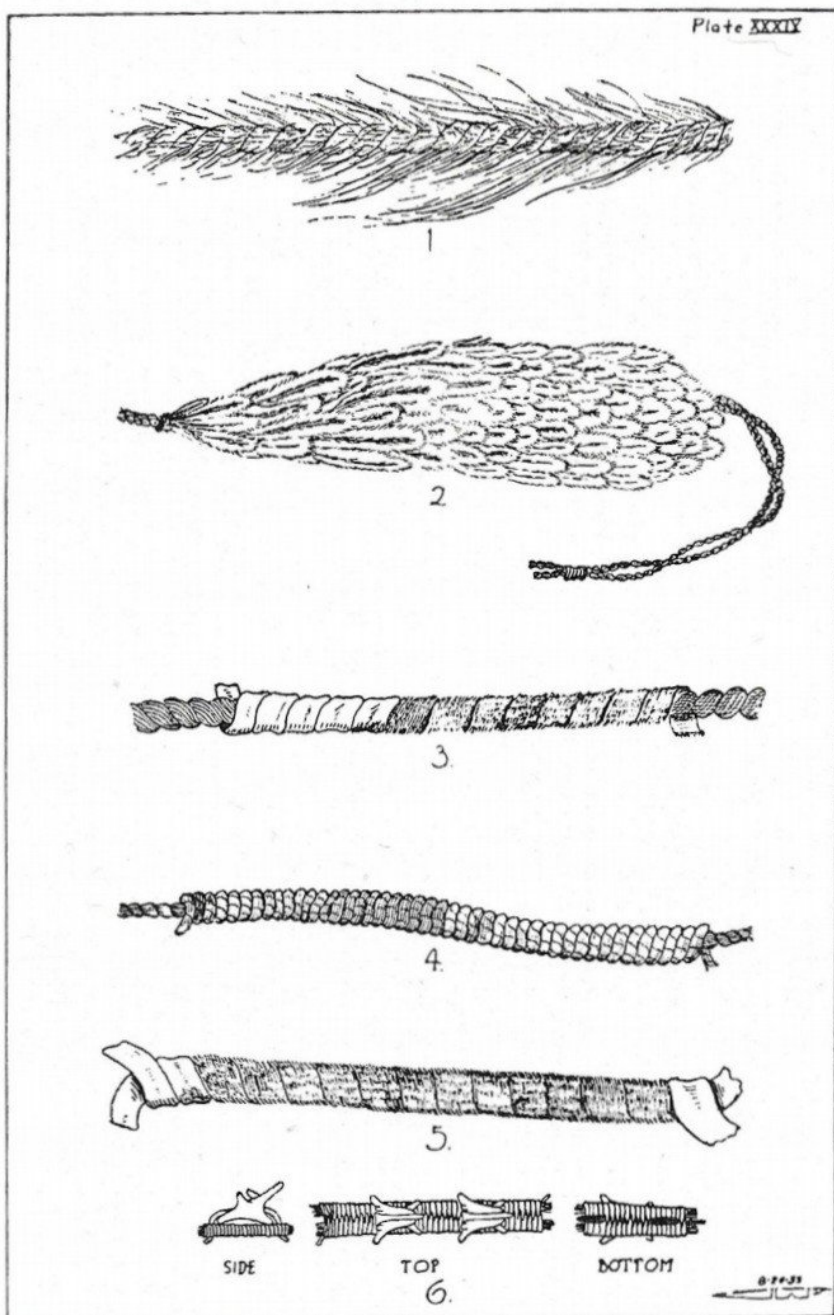


Plate XXXIX. Fig. 1, hair-cord; Fig. 2, feather-cord; Fig. 3, fur-cord with fiber-cord core; Fig. 4, fiber cord wrapped with fiber-cord; Fig. 6, fur-cord without the fiber-cord core. See pages 42-47. Fig. 7, detail of necklace described on page 37.

COIL-WORK CLOTH

Old Shumla cave only, yielded cloth, a single small specimen badly decayed but preservable, the coils measuring ten to the inch. This "cloth", is not woven, but is of coilwork made of very delicate thread. Several specimens of a very heavy, blanket-like cloth were taken from the Shumla caves. This consisted of two types; one made of bundles of fiber, untwisted, laid parallel and twined together, the other of bundles of fiber loosely twisted, laid out in the same manner and twined. This cloth varies from slightly under to slightly over a half inch in thickness. Similar cloth was taken by the Woolford-Martin Expedition in 1931, from a cave in Reagan cañon, Brewster County. Of this material was a portion of the mat depicted by Plate XLIII, figure 1, mentioned under the heading "Fur String and Cloth."

COIL-WORK WITHOUT FOUNDATION

From under a fiber layer three and a half feet below the surface, in the center of Cave No. 1, was taken a perfect twine coil-work bag. It is approximately nine and a quarter by eleven and a quarter inches, the length exclusive of the loops for the drawstrings, these adding two inches to it. From side to side the meshes run five to the inch without undue stretching, seven to the inch in direction of length. Seventeen loops edge the opening. See Plate XLIV, figure 1. Within this bag was another of netting, twenty-nine inches in width and twenty-five inches in depth, knotted mesh one inch square, with drawstring complete. See Plate XLIII, figure 8. Both of these bags are in perfect condition, no broken threads, cordage soft and pliable. The square meshed bag was carefully folded and twisted into a compact ball. Within its folds was wrapped a cluster of thorns of the fish-hook cactus, these tied together with fiber. Twenty-two hooks form the bundle, of which two specimens are wound with delicate fiber as though once attached to a line or leader. See Plate XIII, figure 5.

Coil work specimens are common in the Shumla caves the meshes varying greatly in size. A single twist to the loop is the commonest form (Plate XIV, figure 1) the double twisted loop being rather rare (Plate XIV, figure 2). Occasional speci-

caves has been partially identified by Associate Curator Standley, Field Museum of Natural History, as from "one of the species of Dogbane (*Apocynum*)."

FISH HOOKS

Many fish hooks were taken from the caves. The majority of these were merely thorns of the devil's head cactus, artificially recurved, which had been fastened to lines and so used. These are depicted by Plate XIII, figures 1 and 3. A single specimen retains the fiber winding with which it was attached to line or leader, and this thorn has a smaller and lighter one bound to it to strengthen the hook. Plate XIII, figure 4. Found by Albert Maverick III, in the old Shumla cave, was a cluster of thorns of the fish-hook cactus, these artificially recurved to a greater than natural state, bound together and partially covered with fiber, evidently a lure. See Plate XIII, figure 2. Mr. Walter Hough, in the "Handbook of the American Indians North of Mexico," heading "Fish Hooks," reports the Mohave Indians as using curved cactus thorns as hooks. Another lot of hooks, also thorns of the fish-hook cactus, twenty-two in number, bound together in a fiber wrapping and tied with twisted fiber cord, was found in Cave No. 1. This cluster was enclosed in a tightly folded and twisted mesh bag, which was, in turn, in a very fine coilwork bag. Both are described elsewhere in this report. The find was made in the center of Cave No. 1, under a deep fiber layer three and a half feet below the surface. The bundle of hooks is depicted by Plate XIII, figure 5.

NET NEEDLES OF BONE AND WOOD

Three needles used in knitting nets were found in the Shumla caves. Two of these were of bone, one of wood. One specimen of the first mentioned material was from Cave No. 1, is perfect, and still retains the twine with which it was originally threaded. It is seven inches in length and is made from a leg bone of a deer or antelope of some small species. The proximal end is cylindrical and is formed by the joint, its sides reduced until its diameter is no greater than the balance of the bone. It is about a half inch in width for five inches

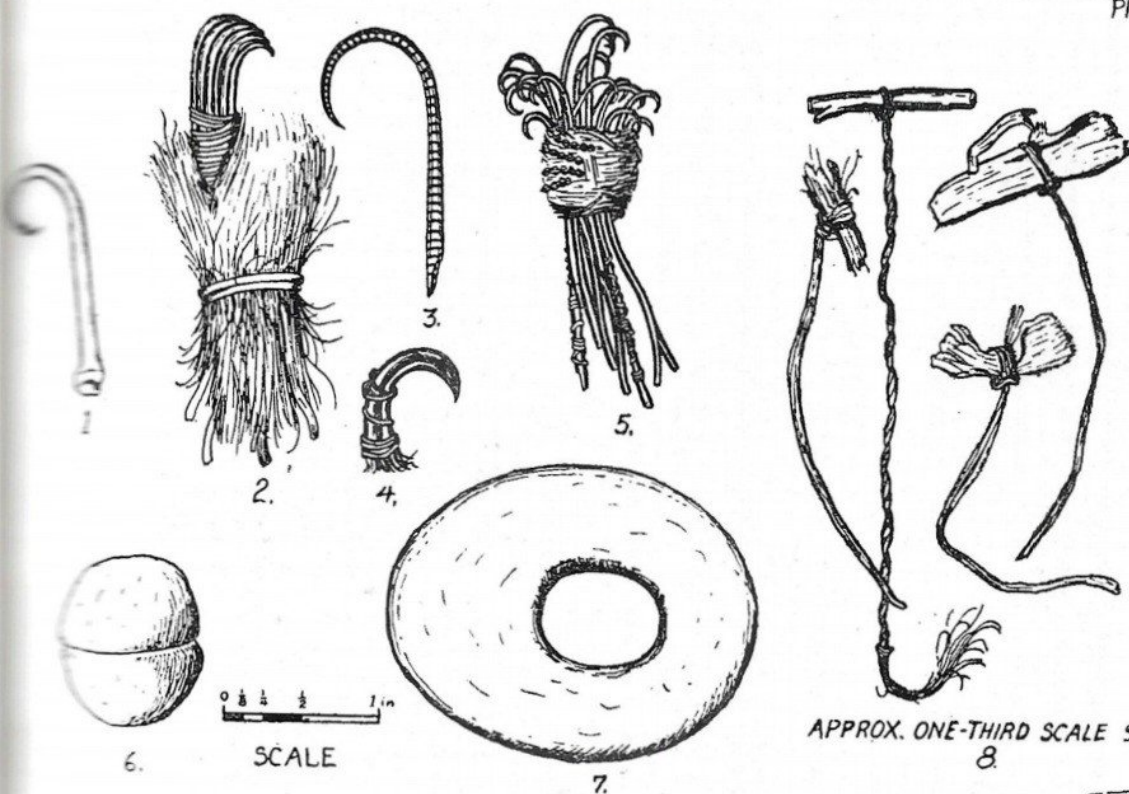
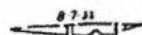
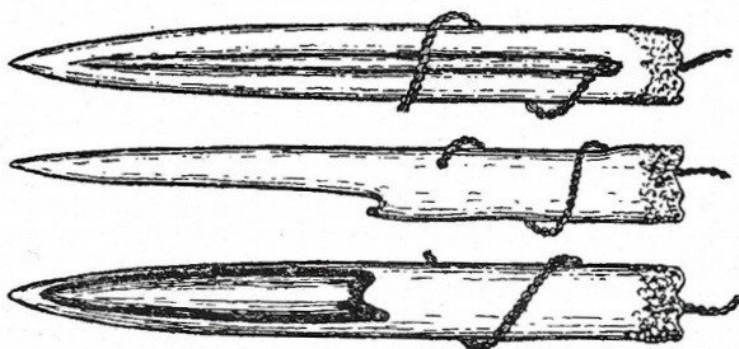
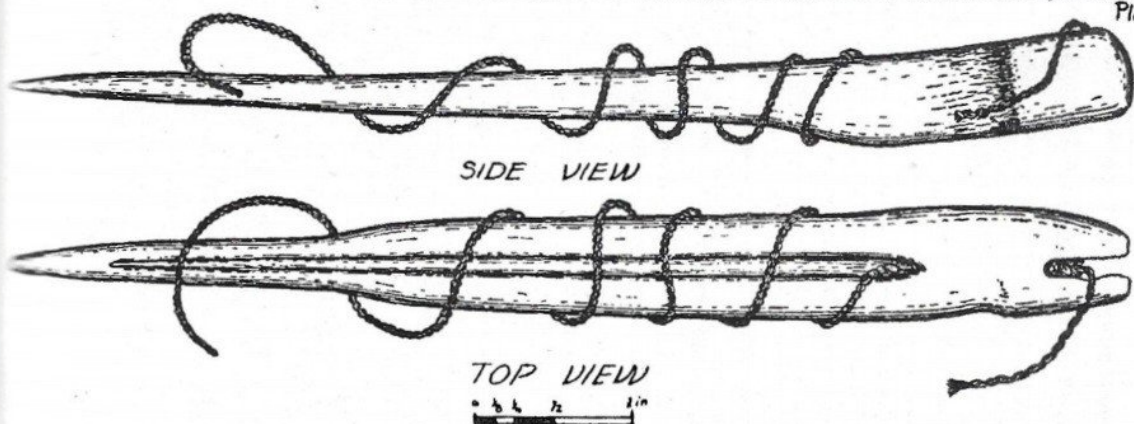


Plate XIII. Hooks, lures, stringers, and sinkers, see pages 50 and 54.

Plate XI. Knitting needles of bone. See page 50.

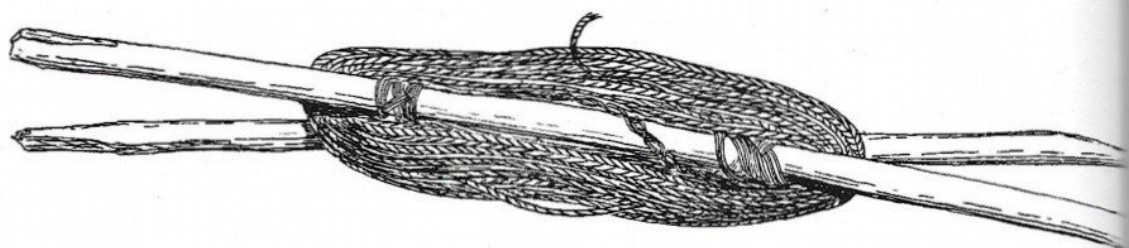


Plate XII. Knitting needle of twigs. See page 53.

of its length, and then tapers to an awl-like point. One side, for a distance of about four inches from the point has the marrow cavity exposed. In the opposing side is an artificial groove five inches in length. In the unpointed end, from side to side, a notch one-half inch deep has been sawed. In the center of this notch a drilled hole has been made, this finding exit at the upper end of the artificial groove. The thread or twine was inserted in the notch and passed down through the drilled hole to the artificial groove whence it emerged and was wrapped around the needle. The twine was thus fed through the needle from the handle end. With this type of needle an entire length of twine, no matter how long, could be utilized without knotting or piecing, and in this manner would be far superior to the net needles of our present coastal fishermen. Apart from use in making nets, the cave needles of bone would have served well in twining fiber and fur mats and robes. Both bone specimens are highly polished and handsomely finished. The needle described above is pictured on Plate XI, upper two figures. On the same plate is

shown a second needle, three views thereof, also of bone, found on the Mexican side of the Rio Grande by a resident of Langtry. It lacks the notch in the handle end but has a sear on one side which would engage the thread and carry it through the mesh thus simplifying the process of knitting. The one wooden needle found is depicted by Plate XII. It is composed of two twigs with the bark still on, these each approximately seven and one-half inches in length. The twigs were laid parallel and tied together loosely with fiber. Twine was wrapped around the fiber lashings and between the sticks as on a spool or shuttle. Such a needle would hold but six or eight feet of twine and would require constant rewinding, frequent piecing, consequent knotting resulting.

Examinations of numerous complete and fragmentary nets discloses the fact that knots in the twine composing the fabric are almost non-existent, which would indicate that the use of the self-feeding bone knitting needle predominated.

NET

From old Shumla Cave was taken a long net of inch mesh wrapped around three pointed sticks. The net was stretched lengthways before wrapping so that meshes are fully extended, and in this condition the bundle measures ten and one-half inches in width, and from three to four inches in diameter. As the bundle has not been unwrapped, measurements are purely surmise when placed at twenty yards in length and thirty inches in width for the net when in use.

Netting bags of varying sizes were found in most of the caves at Shumla, many of them fragmentary. Pieces of netting, portions of larger nets, were used as bags, the object to be retained therein enveloped in it and tied. Net meshes vary in size from one-quarter of an inch to four inches. Plate XIV, figure 3, depicts the detailed mesh. A single small bag of grass was found, all others of twisted cordage and thread.

A RINGED FISH NET

In a grave, over a burial in Cave No. 5, was found a complete fish net with ring and pole attached. Plate XLIV, figure 2. The wooden structure of this device had been purposely

broken before interment, evidently with the idea of "killing" it so it would accompany its deceased owner to his new life. Other offerings in this grave, baskets and other personal possessions, were not "killed", however. In the net was a chequer weave mat (Plate XLI, figure 3) so made and folded that it would hold the net well spread out when it was not in use; a wad of fiber cordage which was thrust into the pointed extremity of the net to aid it in holding its shape, and a chert knife and scaling device.

A FISH-KNIFE IDENTIFIED

The implement mentioned in the last paragraph may, by its place of find, and general appearance, be positively identified as a knife and scaler. Found on a surface site, it would be roughly classified as a scraper and passed over with little comment. Found in the net, its connection with fish and fishing is clear. It is still stained with blood and slime with which its use had brought it into contact. It is roughly elyptical. Its under side is unworked and consists of the original surface exposed when it was struck from the pebble or core. The under side is concave. The upper side shows chipping along one long edge and end, and the other long side has had several flakes knocked from it forming a cutting blade with slightly saw-like edge.

FISH STRINGERS

Specimens of a device for transporting fish, simple, effective, and quite modern in design if not in material, were found in all of the Shumla caves. These consisted of butts of lechugilla (**Agave lechugilla**) leaves two to three inches long. Around each of these a narrow strip of the same material was tied with a single knot. The leaf butt served as a stop to prevent the fish from slipping off the stringer, the strip serving also as a handle to carry it with. Three specimens of this type are pictured by Plate XIII, figure 8, as is a scarce form made with a twig of hard wood and twisted lechugilla fiber cord.

SINKERS

Sinkers were well represented in the Shumla caves. Three specimens that could be identified as such were found in the ashes of Cave No. 6, in old Shumla cave, and Pecos Cave No. 1. Two were spheres of limestone each with a groove completely encircling it. The third specimen was of a soft red stone, otherwise like those previously described. See Plate XIII, figure 6. A flat river pebble, a hole through its center, may have been a sinker, but the possibility that it was a pendant also exists. It was taken from Cave No. 6. See Plate XIII, figure 7.

BASKETRY

The Shumla caves yielded much in the way of basketry, complete and fragmentary specimens. Some of the stitches and weaves are most unusual, possibly unique. Probably the most extraordinary stitch is that pictured by Plate XX, figure 1. The bundles composing the foundation are of fiber, possibly of lechugilla, sewed together by a stitch reported by Mr. Frank M. Setzler, U. S. National Museum, to whom a diagram of it had been sent, as hitherto unknown. According to Mr. Setzler the nearest approach to it previously reported is in basketry from Tierra del Fuego, known as Fuegian coiled basketry, and a somewhat similar type from southern Utah. These, however, are only "somewhat similar," neither identical with the Shumla specimen. In writing about the Shumla stitch, Mr. Setzler refers, for comparison, to the Annual Report of the U. S. National Museum, 1902, pages 257 and 258, figure 59 by Otis T. Mason, and to plate 31 of the same article, a basket stitch described by the late Dr. George H. Pepper.

Other coiled basketry stitches from Shumla are depicted by figures 2, 3, and 4, Plate XIX. Figure 2 shows a bifurcated interlocking stitch found in the Shumla caves rather rarely; figure 4 the interlocking stitch common all over the Big Bend section of Texas, and found in Mexico south thereof. Figure 3 depicts a very rare non-interlocking stitch. Bundles used in these three types of basketry were composed of many diverse materials including grass, strips of sotol leaf, grass stalks, lechugilla fiber, split rods, etc. Apocynum was

used in one specimen for both bundles and thread.

Plate XX figure 2 depicts a diagonal plaiting in which the splints alternate, wide and narrow.

Plate XX, figure 3 depicts the mouth of a small necked basket. The selvage was formed by turning the ends of the splints inward and downward over a ring of sotol fiber twisted cord and twining with two rows of similar string.

Plate XX, figure 4, is an unfinished specimen, possibly the leg of a basketry human effigy in process of manufacture. Modern Mexican Indians weave human figures in basketry, and it is possible that this article was of that nature.

Plate XX, figure 5, shows a twined weave, the splints being sotol leaves dethorned.

Plate XIX, figures 5 and 6 depict a twined weave in which the twining alternates the splints which it binds together in pairs. This weave is rather scarce at Shumla.

Plate XIX, figure 7, depicts a weave in which the warp splints pass over two and under one, the weft over two and under one. This also is rather uncommon.

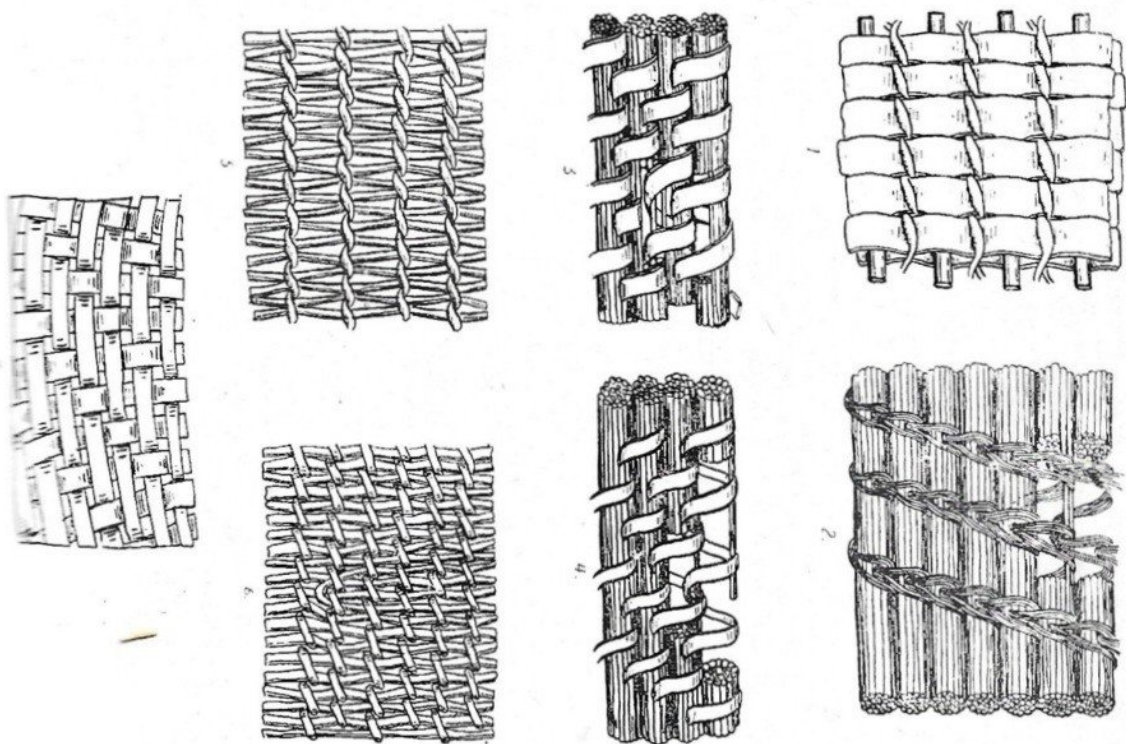
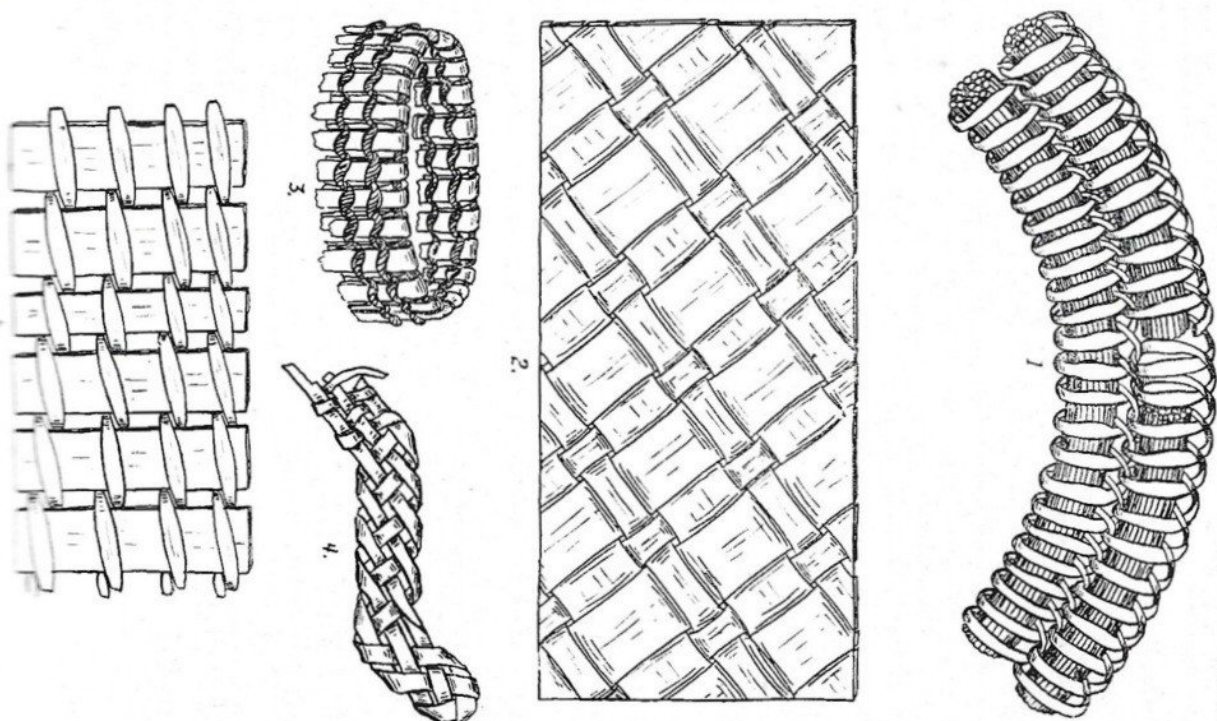
Plate XXI, figure 1, depicts a diagonal chequer weave of close type; figure 3 a chequer weave loosely woven, the leaves undethorned; figure 4 a chequer weave in which the warp splints were doubled, those of the weft single.

Plate XXI, figure 5, is an under two, over two twined weave; and figure 2 an over one and under one weave in which the warp splints are widely separated, the weft closely woven.

Plate XXII, figure 7, depicts a basketry armlet or bracelet taken from a skeleton in Cave No. 5. The foundation is formed by a double circlet of sotol leaf strips. Short sections of split and flattened grass stalks were laid under these circlets and were then bent upward and the ends turned down between the circlets where they were twined by two cords of sotol fiber which held them in place. This specimen is in bad condition but enough remains to make possible the restoration shown in drawing.

Plate XXII, figure 3, is a foundation for a feather plume which was found with a skeleton in Cave No. 5. Figures 4 and 6 were found in the ashes of the caves, probably also plume foundations.

Plate XXXIV, depicts a very unusual form of coiled basketry. Slender bundles of fiber were wound with strands of



Plates XIX and XX. Basketry stitches and weaves. See pages 55-58.

two fibers twisted loosely together, at intervals these extending to the previously made portion of the coil, and, twisting back on themselves continued the wrapping of the bundle. This type of basketry has the appearance of a net.

Chequer weave baskets were frequently finished by the turning of the splints inward and twining the ends down to the basket itself by means of one, two, or three twinings of twisted cord. Plate XLI, figure 5 shows the selvage of a portion of a basket twined with a single cord.

BASKETS

Two complete coiled baskets were found in a grave in Cave No. 5, depicted by Plate XL, and numerous portions of coiled baskets were taken from the same and other caves. The two perfect specimens are both of the interlocking stitch technique. A tiny toy basket was taken from Cave No. 1. From the same cave was taken a complete and very unusual basket, the foundation splints of which are of rods, which spiral from the center and are twined together. The entire vessel is coated with a water-proofing gum, and was evidently designed for the purpose of carrying water. The center of the basket protrudes upward inwardly. This specimen is very poorly depicted by Plate XLI.

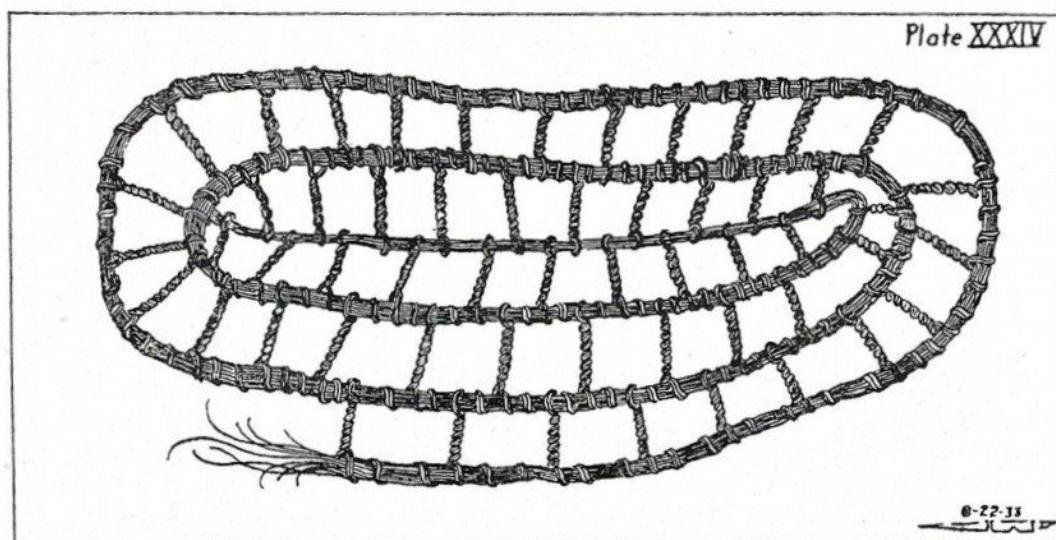


Plate XXXIV. Rare type of coiled Basketry. See page 57.

A BASKETRY POUCH

From Old Shumla Cave was recovered a pouch of twilled weave matting which had been once folded and then sewed together on three sides, the fold forming the fourth edge. It measures four by five and a half inches. Its edges are unselvaged, evidently made from a piece of waste, or from an unworn portion of a mat that was no longer useful. No means of opening this without removing the stitches was provided. One side had been broken and whatever had been stored in it had been released before the container was found.

BURDEN CARRIERS OR BELTS

Burdens were carried on the back supported by straps of twilled weave basketry which passed around the forehead or shoulders, possibly both. Specimens found vary in width from three-quarters of an inch to four inches. One is unusual in the fact that it is ornamented, embroidered with a strip of rawhide which zigzags across it. The portion found is nine and a half inches in length and one and three quarters in width. The thong crosses the band eight times on the piece found, thus forming four complete zigzags.

GAME CARRIERS

A device for carrying small game, specimens found in all of the Shumla caves, consists of a single cord of twisted fiber about a foot in length. Both ends are knotted, around short sticks or twigs. The center of the cord was wrapped around the neck of the animal or bird to be transported, the two cords twisted together, and the two twigs held in the hand. Most of the specimens found show by the twisted condition of the cords the method of use.

BRAIDS

Braids of grass, sotol leaves, lechugilla strips, twigs, etc. were used for a variety of purposes. Braided fibers were used in tying together bundles of grass, twigs, medicinal (?) plants, etc. One braid had evidently been intended as a handle for

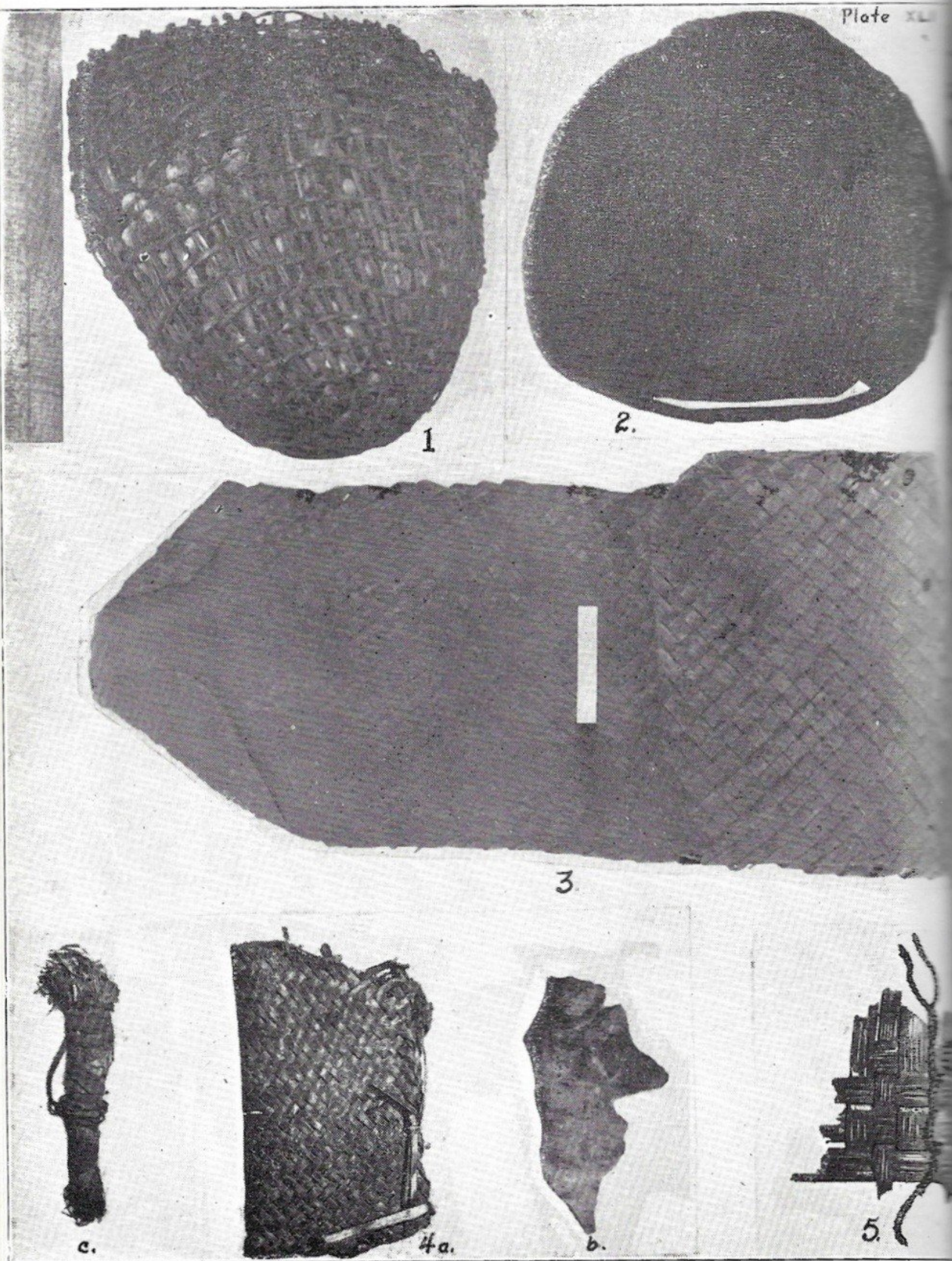


Plate XLI. Fig. 1, twined storage basket filled with buckeyes, see page 78; Fig. 2, water-proofed basket from Cave 1, see page 58; Fig. 3, stretcher for fish net, see page 54; Figs. 4-a, 4-b, and 4-c, basketry sheath, flake knife, and bundle with contents unknown, see page 23; Fig. 5, selvage of basket showing cord twining. see page 58.

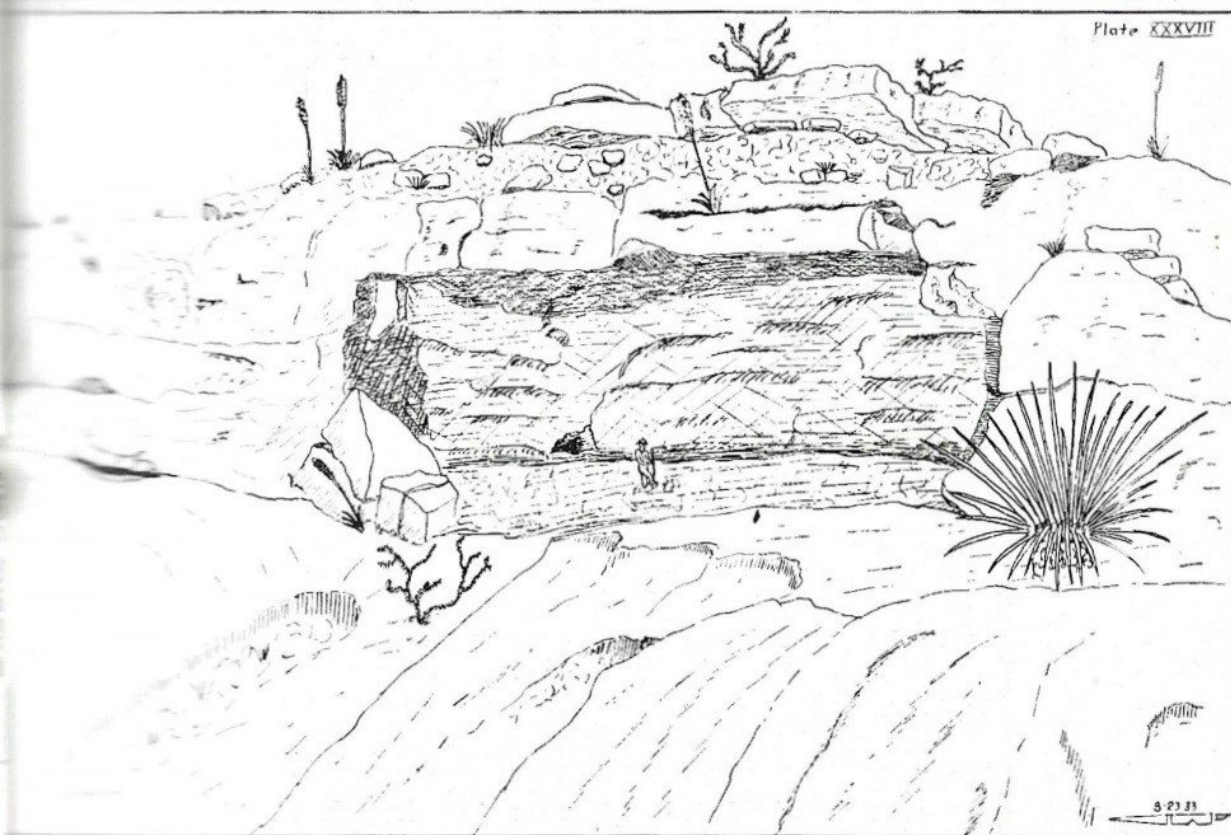
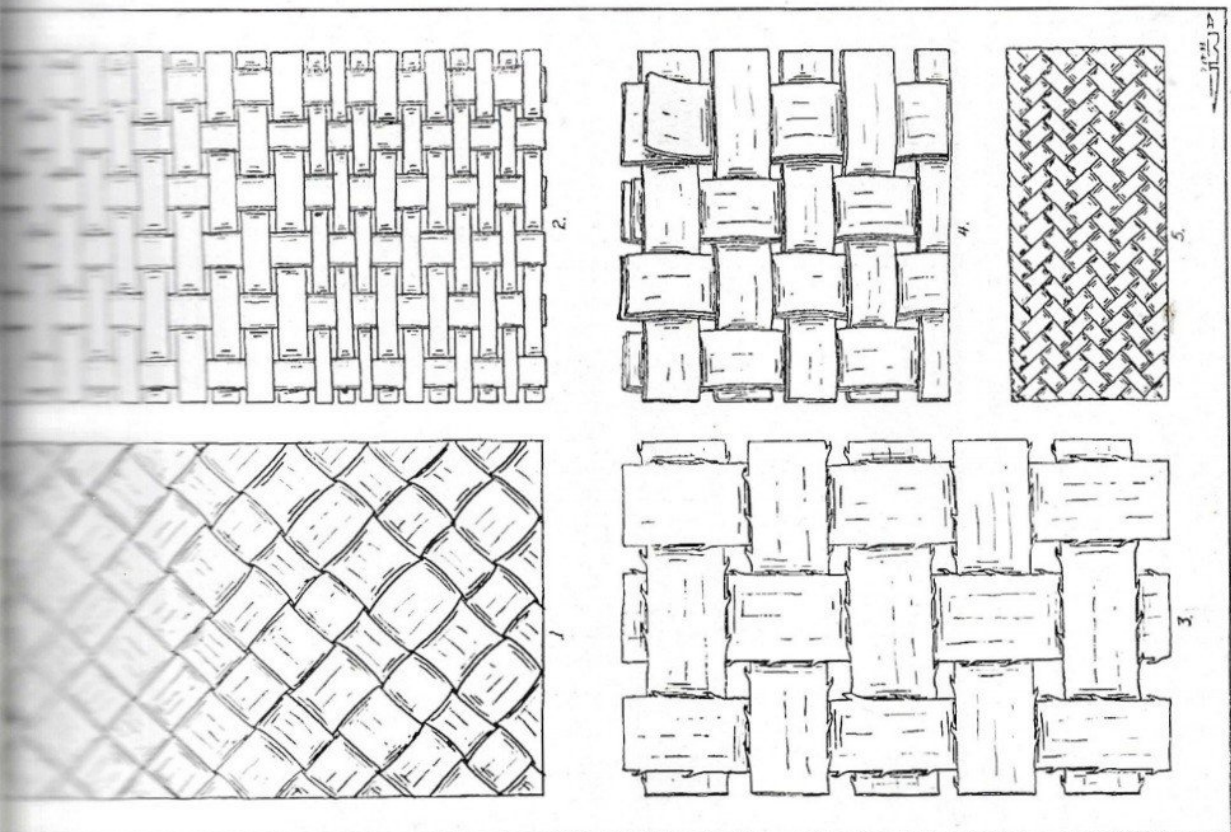


Plate XXI. Matting and basketry weaves. See page 55-58.
 Plate XXXVIII. View of Cave No. 3, sketched by expedition artist.

a basket, but this had not been attached. Braided strips of leaf were commonly used in transporting cactus leaves. One such device consists of a loop of sotol strip three-quarters of an inch across. A hole had been made in the leaf and the fiber thrust therethrough and tied. Attached to the loop was a flat braid of sotol leaf about eight inches in length. When found it still retained the bend which carrying in the hand had caused it to attain.

A LASH OF SOTOL STRIPS

A lash made of strips of sotol leaf was taken from old Shumla Cave. It appears to have been made of a single leaf. The thick end is bound with fiber thread, it is braided toward the small end of the leaf, and the slender end is knotted forming a lash. Its length is ten inches.

PIPES

Five pipes of reed and half of a stone pipe were found in the Shumla caves. The reed pipes were made from a single section of reed stem with the joint left on one end, the other joint removed. The partition in the joint that was allowed to remain is roughly punctured in some instances, smoothly cut away in others. The joint end forms the mouth-piece, and this was pressed against the lips in smoking, not

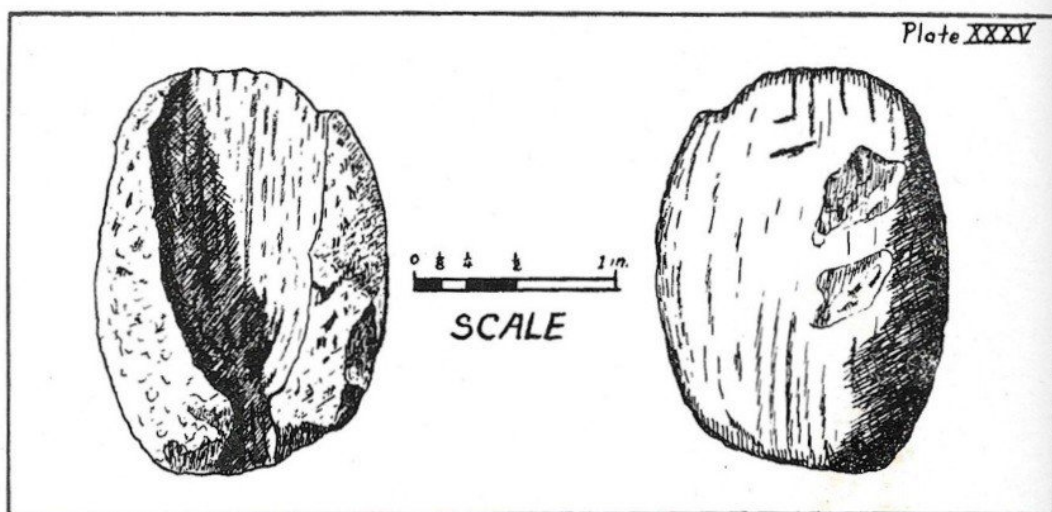


Plate XXXV. Section of limestone pipe. See page 64.

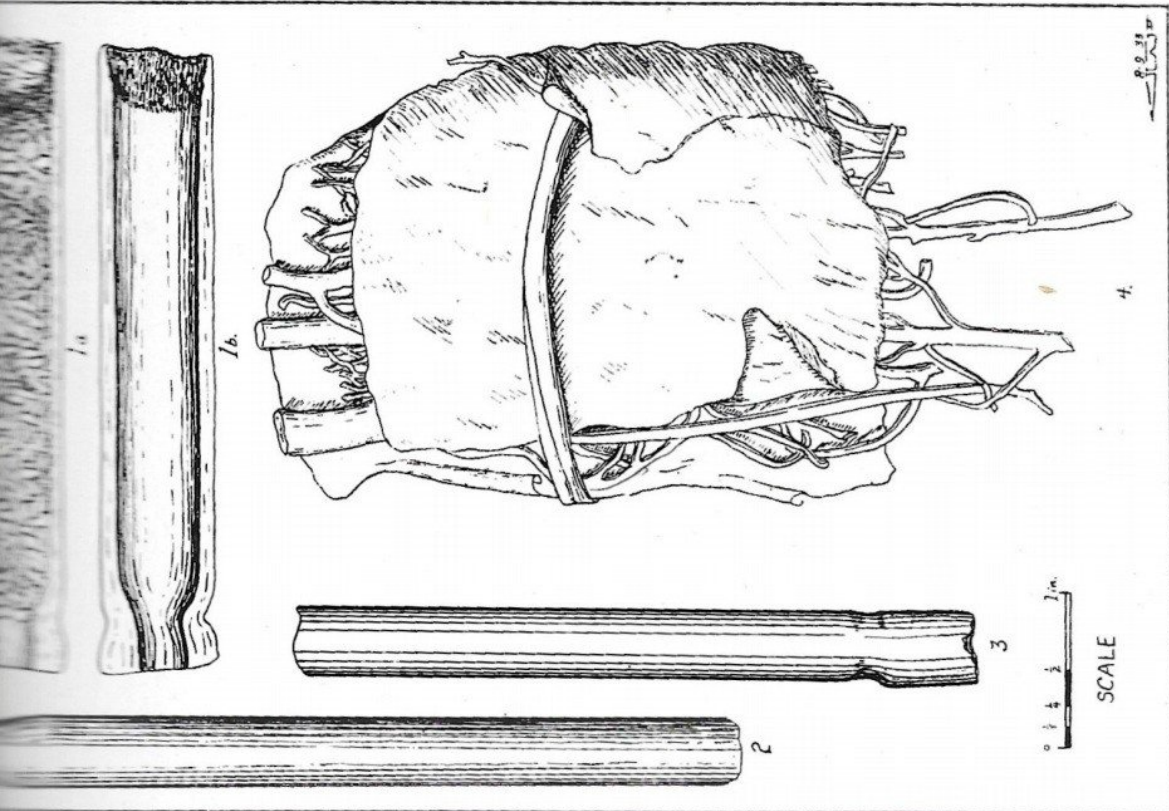


Plate XV. Reed pipes with "tobacco" (cedar foliage) still in them, and a pouch of the same "tobacco", the wrapping made of the skin of the leaf of the prickly-pear. See pages 62, 63 and 64.

held between the teeth. Stems were not used with them. The end without a joint served as the bowl. These pipes burned much as would a cigar, the reed itself being consumed with the "tobacco." The three specimens found with the dot-
 tie still therein were shortened to the same extent that the contents had been burned. Evidently they were smoked but once and then discarded. In all cases where the "tobacco" remained within the bowls, this substance was cedar foliage. (Plate XI, figures 1-a, 1-b, 2 and 3.)

A reed pipe that had been prepared for use but which had not been smoked was found in old Shumla Cave. It is five and a half inches in length and three quarters of an inch in diameter. The joint remains on one end, the partition cut neatly away. The end where the fire was to be applied, was scraped thin, the glossy epidermis of the reed removed, for one and three quarter inches toward the mouthpiece. This would have aided the pipe itself to burn more readily than were it not so prepared.

A single half portion of a stone pipe was recovered, a full half split lengthways of the bowl, from opening to opening, this of limestone, its exterior roughly shaped by scraping lengthways, its bowl hollowed out by gouging rather than by drilling. Its stem cavity is cut in continuation of the length of the bowl and in line therewith. Kidder and Guernsey, in their "Archaeological Explorations in Northeastern Arizona" depict a similar pipe of limestone (Plate 188, figure 94-c and 94-d) in the accompanying text stating it to be "surely identifiable as Basket Maker." Moorehead, in his "Stone Age in North America" depicts a similar "Basket Maker pipe" with a wooden stem in prolongation of the bowl. (Plate XXXV).

Mr. Edwin B. Coffin, Museum of the American Indian, found reed pipes similar to those described above in Bee Cañon Cave, Brewster County, Texas.

"TOBACCO"

"Tobacco" was represented in the Shumla caves by a single pouch of the skin of the leaf of the prickly pear, the thorns removed, this carefully packed with twigs and foliage of cedar. The pouch was tied together with grass fiber. The cedar still retains its aromatic fragrance. (Plate XV, figure 4).

CLOUD-BLOWER OR LARGE CEREMONIAL PIPE

A portion of a "cloud-blower" of stone was taken from old Shumla Cave. This device is actually a very large tubular pipe, a small bowl at one end forming the mouthpiece, a large bowl at the other the fire cavity. Similar pipes of large size were used by the Pueblos for purely ceremonial purposes, and specimens of such have been found on camp-sites on the Texas coast south of Corpus Christi bay. The portion found at Shumla is a lengthwise section with mouthpiece, the inside of which is sooted, and part of the fire cavity which is deeply discolored from use. In form it is identical with one picked up on a camp-site on Banquette creek by Mr. Henry Elrod, of Houston, and which is now in the Witte Memorial Museum. The cloud-blowers were also used in preserving and transporting fire. Tightly packed with slow burning material fire could have been kept alive for many hours with care.

REED SEED CONTAINERS

Numerous single sections of reed stems with one joint removed by cutting were found in the Shumla caves. In appearance these are much like the reed pipes, but the partitions at the joints are not punctured. As found at Shumla these were without contents. Mr. Edwin B. Coffin, Museum of the American Indian, found them in the Bee cañon cave, Brewster county, stoppered with grass plugs and containing seeds of the *Amaranthus paniculatus*. Mr. Frank M. Setzler, U. S. National Museum, found them in caves in Brewster county, i. e. "cane tubes containing minute seeds."

REED TUBES

Reed tubes that were neither pipes nor seed containers were found, but they were not plentiful. One specimen is six inches in length, and three-quarters of an inch in diameter. Both joints are cut away, the ends smoothly finished. See Plate XXXVII, figure 3.

FIRE-MAKING IMPLEMENTS AND MATERIALS

These consist of drills, hearths, and tinder bundles. The drills are usually long slender stalks of sotol. Two of hard wood and showing the polish of long use were found. The hearths or under sticks are usually of sotol also, but two specimens of reed form the exceptions. The drills were rotated between the palms. Evidently the bow as a fire-making implement was not known at Shumla. Two small bows of a type that could have been used for the purpose, but of insufficient strength, were taken from the caves. These are mentioned elsewhere. The drills do not show use with a bow cord. Two methods of preparing the hearths were followed. The simplest was merely the splitting of a sotol stalk. The drill was applied to the flat surface so created and after the friction of the drill had formed smouldering charcoal this was transferred to tinder and blown into flame. A superior type of hearth had a notch cut in the rounded side of the split sotol stalk directly below and slightly toward the edge from the place where the drill was to be applied. A tinder bundle was placed below

the notch. When the drill had bitten into the hearth to the notch the smouldering charcoal fell through it into the tinder. This means of fire making was far more certain and rapid than when necessary to transfer the smouldering charcoal from hearth to tinder. The reed hearths were split, and both specimens show that they were drilled entirely through in accomplishing their purpose. Plate XLIII, figures 3 and 4.

A pair of fire tongs was taken from Cave No. 7, this made of a sotol stalk split and tied with a strip of lechugilla leaf. The inner sides of the jaws of this appliance are charred. Edwin F. Coffin, Museum of the American Indian, found tongs of this type in a cave in Brewster County. Others were taken from Pecos Cave No. 1, and Shumla Cave No. 5.

WOODEN SCOOPS

Kidder and Guernsey, in their "Basket-maker Caves of Northeastern Arizona," (Peabody Museum, 1921) picture on Plate 38 three wooden scoops, and on page 90 state that such objects "were found so regularly in Basket-maker caves that we came to regard their discovery in the preliminary examination of a site as indication that other traces of Basket-maker occupancy would be found." Jesse L. Nusbaum, in his "A Basket-maker Cave in Kane County, Utah" (Museum of the American Indian, Heye Foundation, 1922) depicts on Plate LIX, five similar specimens, and, on pages 115-16 clearly describes them. Quoting him— "In every Basket-maker cave that we have excavated and in Cave du Pont as well, there have turned up in the sand or rubbish about the cists a certain number of scooplike objects of wood. They range in length from 5 to 18 inches and consist of thin sections from the outer parts of logs of wood; their outer surfaces are unworked and retain the natural convex form of the log, their inner surfaces have been made concave by charring and scraping; their edges are always much worn." These objects, so-called "scoops" do not "lend themselves" well to better description and the writer will permit Mr. Nusbaum's words to describe those found near Shumla where they were very numerous in the caves. Specific descriptions of two of the Shumla specimens follow.

One of these was made of a slab of wood and is somewhat shovel-shaped. It has a length of eight inches, is three and a half inches wide at the digging end, the handle end two and one-quarter inches in width. This was taken from Cave No. 1, as was the next described specimen which is twelve and a half inches in length and about three and three-quarter inches in breadth, this evidently a scoop. All specimens in this class are charred. Most of them indicate, by their worn condition, much use.

WOODEN CELTS

The writer does not find wooden celts described in connection with cave finds of other investigators, but, would be inclined to classify figure a, Plate LIX, in the before mentioned "A Basket-maker Cave in Kane County, Utah," by Jesse L. Nusbaum, as a celt rather than a "scoop." From Cave No. 6 at Shumla was taken a wooden celt six and a half inches in length and two and three-eighths inches in width. Its upper and lower surfaces and edges are flat, its ends beveled. A somewhat similar specimen was taken from Cave No. 8, length six inches, width two and one-eighth inches, its ends rounded instead of beveled. Both are blackened by fire probably applied in some hardening process.

WOODEN NEEDLES

Numerous wooden needles were taken from the caves, two depicted by Plate XXXVII, figures 1 and 2. These are hardwood twigs debarked and sharpened. Lengths of leaf, evidently used as thread, has been bound to their unsharpened ends with fiber.

MISCELLANEOUS WOODEN OBJECTS

Miscellaneous objects of wood, wedges, plugs, stakes, sharpened twigs and hardwood sticks were found in great numbers. Guessing at the uses to which these could have been put would be unprofitable, and descriptions of the items themselves would take up more space than such data concerning them would be worth.

METHOD OF SHARPENING WOODEN IMPLEMENTS

The method of sharpening sticks with a flint knife was illustrated by dozens of specimens found in the caves. No attempt was made to point the end of the wood. It is evident that the end of the twig or stick to be sharpened was held toward the body, the knife used in the manner of a spoke-shave. The cutting stroke ceased an inch or two inches from the end of the object to be pointed, and left a shaving of wood attached thereto. The strokes were continued until the point was attained. The short remnants, some of them still retaining numerous shavings were found in all of the caves.

PLANTING STICKS

Agricultural implements were very scarce, and consisted of planting sticks varying from twenty to twenty six inches in length. It may be an error to so classify these wooden implements as the Shumla evidences of agriculture are very slight, merely tree, bush, and grass seeds, no corn nor beans, four squash seeds reported by the Woolford-Martin Expedition. However, these sticks are very like those depicted by Kidder and Guernsey, in their "Basket-maker Caves of North-eastern Arizona," Plate XXXVII, figure "c", although shorter. The working ends are pointed, the handle ends slightly crooked. "Planting-stick," probably describes these specimens better than does "digging-stick," the term commonly used.

TINY BOWS

Three twigs bent in the manner of bows, and with cords attached, were taken from the caves. These have the appearance of being bows, possibly toys, but probably served some other purposes. They are not of stoutness enough to be used with a fire-drill. One is depicted by Plate VII, figure 4. Edwin F. Coffin, in his "Archaeological Exploration of a Rock Shelter in Brewster County, Texas," Museum of the American Indian, Heye Foundation, 1932, states that found in his Bee Cañon Cave, were— "Small bows, about a foot in length, made from a branch or twig, and bent with a string of fiber, were the only bows recovered. These were probably

toys, for although they are strong enough to rotate a fire-drill, it is doubtful if they were used as such, for no parts of the fire drills found show evidence of having been used in that manner." Mr. Coffin's description covers the small Shumla bows as well as those from Brewster County, except, that the former are not strong enough to rotate a drill.

FEATHER OBJECTS

Feather objects were very scarce. Feather cord and a small ornament, elsewhere described, a few unassociated single feathers, the use of strips of quill in the manufacture of feather string, and feathering on arrowshafts completes the list of uses for feathers as evidenced by the expedition's finds in the caves at Shumla. A plume foundation, a device of interlaced leaf strips to which small feathers were attached, is the next specimen described.

A PLUME FOUNDATION AND A FEATHER ORNAMENT

Plate XXII, figure 3, depicts a plume foundation recovered from a grave in Cave No. 5. Figures 4 and 6 on the same plate may also be plume foundations. Figure 5 is a cluster of three feathers tied together with fiber.

SANDALS OF FIBER

Sandals were found in quantities in the Shumla caves. These were made from lechugilla and sotol leaves, some few of untanned skins. Many were badly worn and fragmentary, others almost perfect, and complete with ties. So numerous were the techniques employed in manufacture that a long period of study will have to be accorded to them before they can be properly described and catalogued. Numerous specimens have been dissected, however, and a few types have been selected for inclusion in this report.

Plate XVI, figure 1, depicts the first step in the manufacture of the commonest type of square-toed sandal. Two lechugilla leaves were dethorned, laid parallel and flat, and were embowed inwardly toward each other, the loops so formed tied loosely together with fiber. The second step

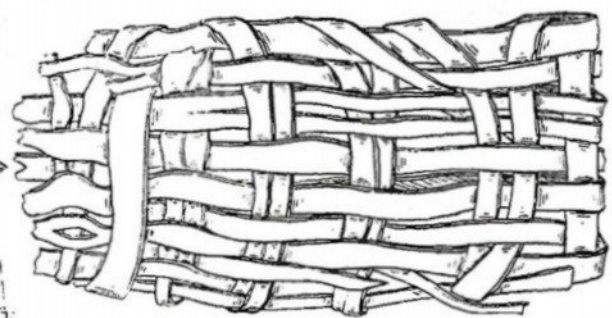
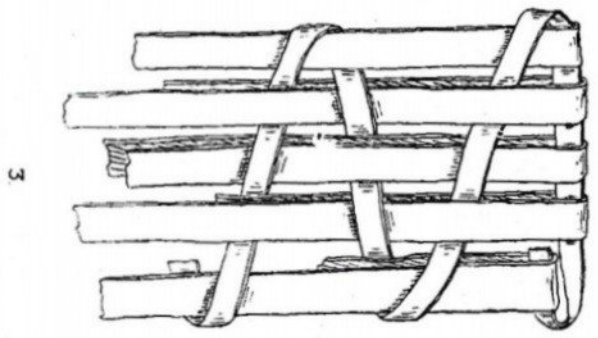
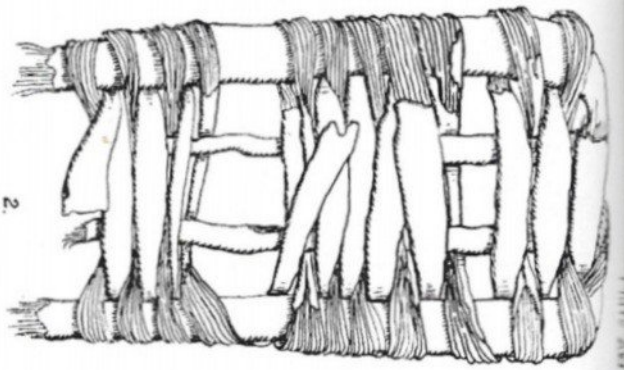
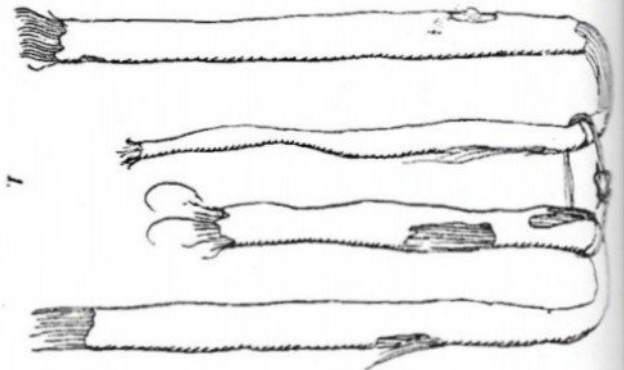
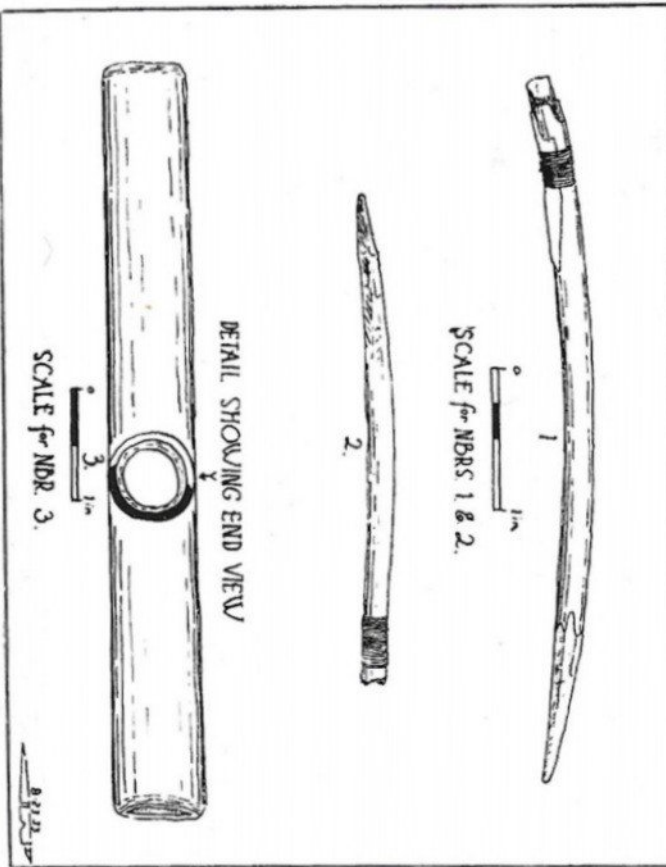
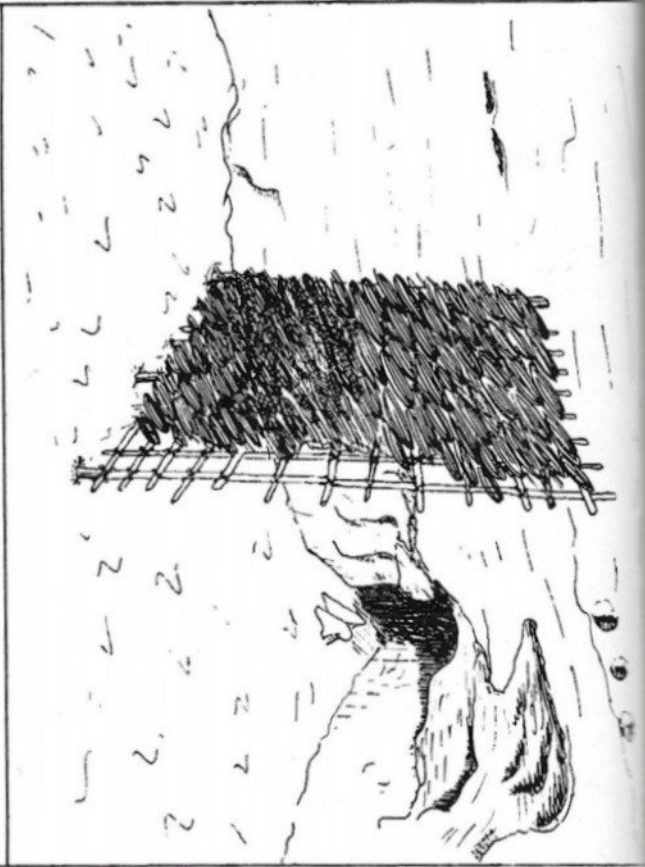
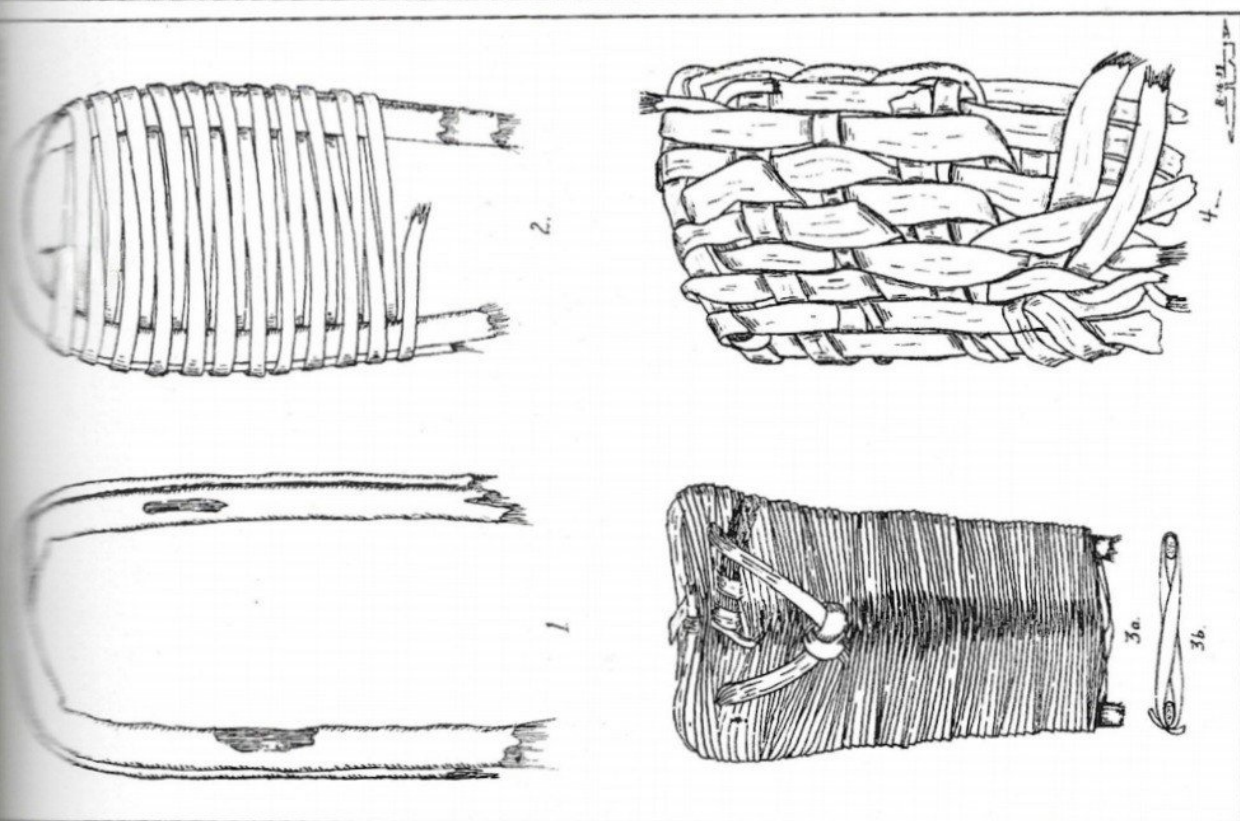
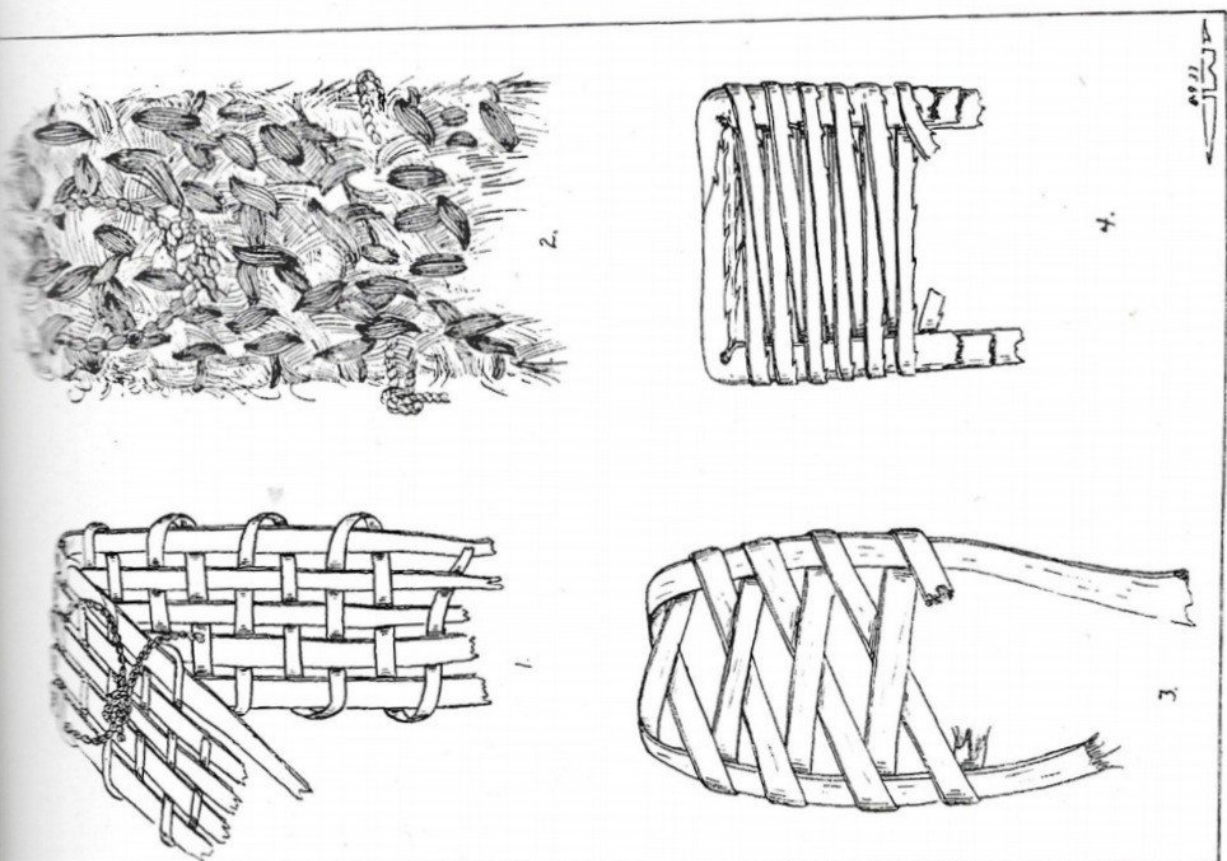


Plate XXXVII. Upper. Partition or screen in Cave 7. See page 9. Same plate, Figs. 1 and 2, wooden needles. See page 67. Same plate, Fig. 3, reed tube. See page 65. Plate XVI. Sandals and parts of sandals of fibrous plants. See pages 69-73.



Plates XVII. and XVIII. Sandals and parts of sandals of fibrous plants. See pages 69-73.

wove the lengthways foundation together with additional leaves in figure-eight manner. See Plate XVI, figure 2. At intervals the weft strands were omitted so additional warpways leaves could be interlaced. The epidermis of the leaves was not disturbed. The ends of the added lengthways strands were shredded where they protruded on the under side of the sandal thus forming a soft pile or cushion. Wear shredded the foundation strands.

Plate XVI, figure 3, pictures the foundation of the square-toed sandal that was made by folding five lechugilla leaves backward upon themselves, all laid parallel. Another leaf, or strip of leaf, was run through the loops thus formed and was then interwoven as depicted. Additional weft strands were added. None of the specimens of this type found by the expedition showed that the epidermis of the leaves had been removed, although all had been dethorned. Figure 4, Plate XVI, shows a portion of a finished sandal of this type.

Plate XVII, figure 1, depicts the foundation of the commonest form of round-toed sandal, two lechugilla leaves laid upon each other and bent into "U" shape, a twist given to it at the toe. In flat figure-eight fashion strips of lechugilla leaves were woven weftways into this, and warpways strands were added. (Plate XVII, figure 2). The latter were placed irregularly, their many ends shredded to form cushions on upper and lower surfaces.

Plate XVIII, figure 1, depicts a "two-layer" sandal of lechugilla strips, five of these laid parallel and woven together weftways by other strips. When this portion of the process of manufacture had been completed the sandal was folded and the two layers made one by additional warpways strands woven in. Plate XVII, figure 4, depicts a finished sandal of the "two layer" type stitched together with the added warpways strands.

Plate XVIII, figure 2, made entirely of lechugilla fiber from which the parenchyma and epidermis had been removed. A wad of this fiber was roughly flattened into sandal shape and was then sewed together with stitches of thick and very loosely twisted cordage placed irregularly wherever it might do the most good in holding the fiber mass in shape. Five specimens of this type were found, one of very small size complete in every way. This type of sandal always has ties

of twisted lechugilla cordage.

Plate XVIII, figure 3, depicts the foundation of another form of round-toed sandal very common at Shumla. Warpways strands were woven into this, their ends shredded to form a cushioning pile.

Plate XVIII, figure 4, depicts the foundation of another square-toed type made of lechugilla leaves, epidermis and thorns not removed. Warpways strands were woven into this type of sandal, their ends shredded.

Plate XVII, figures 3-a and 3-b represent a very rare sandal. Only two specimens were found near Shumla. Just how the foundation was made has not as yet been discovered, as specimens were too scarce to permit the destruction of one by dissection. There are but two warpways strands. The covering is of sotol leaf strips woven in figure-eight fashion and closely overlapping each other. This type of sandal was exceedingly delicate and could have been of but little service.

Too late to illustrate in this report, a tiny sandal that had been made for a child too young to walk was found in Pecos Cave No. 1. It is of the type depicted by figure 2, Plate XVIII, but is neatly bound around the edges with loosely twisted fiber strands, and, the reenforcing cordage of the sole crosses it in even rows of carefully placed stitches. A neatly made specimen.

A few very delicate sandals of sotol leaves were found, single layers, unpadding, and of little or no practical use. Only one specimen of this type was in preservable condition. Some fiber sandals of apparently immense size were found. On measurements being taken it was found that these corresponded to a size eight shoe. Of over one hundred sandals found these were the largest. Many were very small and very narrow, and, it would appear, judging by them, that the Shumla cave dwellers had exceedingly small feet, the average much smaller than that of the American of today.

SANDALS, OF HIDE

While sandals of rawhide and tanned skins were not as numerous in the Shumla caves as were those of vegetable fibers, ten were recovered. Some of these were made from skins from which the hair had been removed, while others still

retained some fur. No special technique was followed in the manufacture of these. The skins were not cut to a pattern. Apparently a piece of hide was selected, which, by folding, would form a cushion for the entire foot. The tye-cords were placed thereon, in such a manner, that the several folds would be held together. Plate XLIV, figures IV, VIII, and IX, depict three of the specimens, the last mentioned evidently made for a very small child or infant.

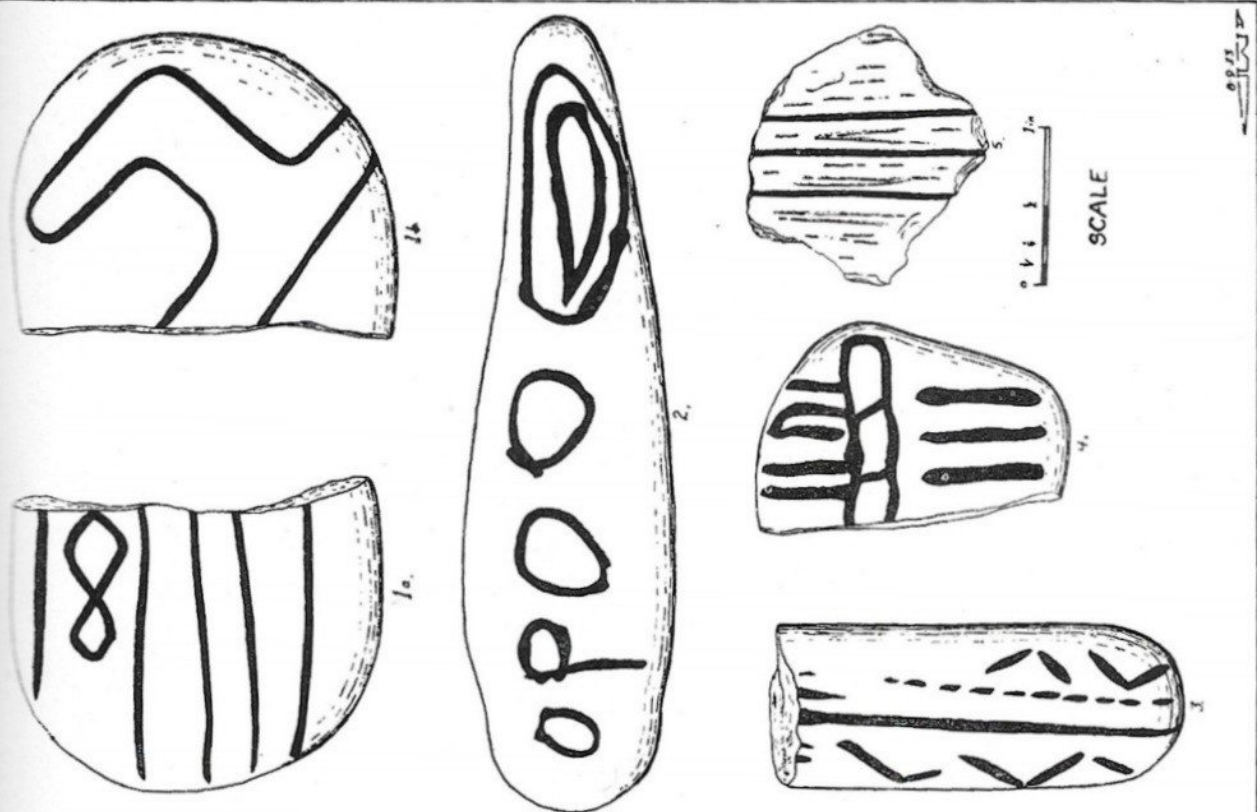
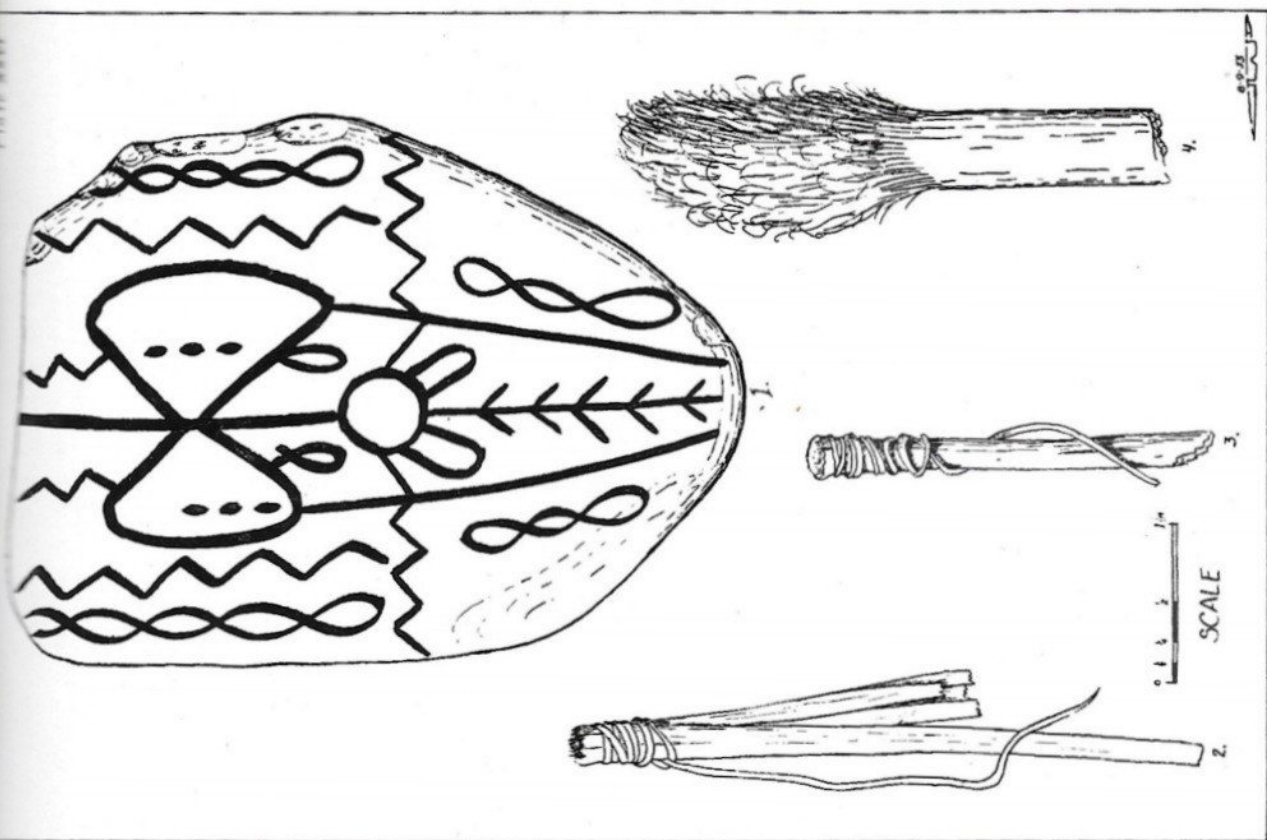
RAWHIDE AND DRESSED SKINS

The use of skins, dressed and undressed, as portrayed by the Shumla finds, consisted of fur-strings and fur-cloth, mentioned elsewhere, sandals, a gee-string, pouches, and thongs, the latter used in various ways in winding, binding, tying and sewing. Three skin sandals are depicted by Plate XLIV, figures 4, 8 and 9, rough sheets of leather folded to approximate shape. The tye-cords are of strips of lechugilla leaves, and beside serving the purpose of holding the sandal to the foot, pierced the folds of the hide and kept the folds in shape. Some of these were made of skins with the fur still thereon, others without. Deer and beaver fur still remaining on specimens found denote that skins of these animals were used. A perfect gee-string of rawhide is in the collection of Mr. Guy Skiles of Langtry, taken from a cave near Shumla.

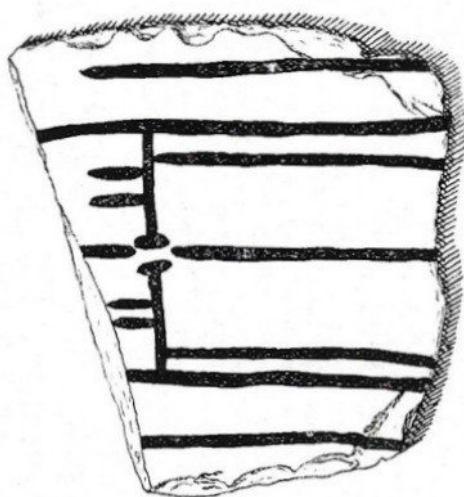
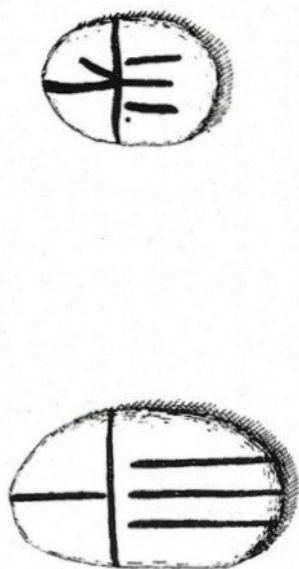
Some of the infant mummies had been wrapped in dressed hides, with the fur on, before being encased in matting. Numerous fragments of skin with holes pierced along the edges, which had been made so that the hide could be laced in a frame and stretched while being cured, were found in all of the caves.

PAINTED PEBBLES, PAINTS, BRUSHES, AND PALETTES

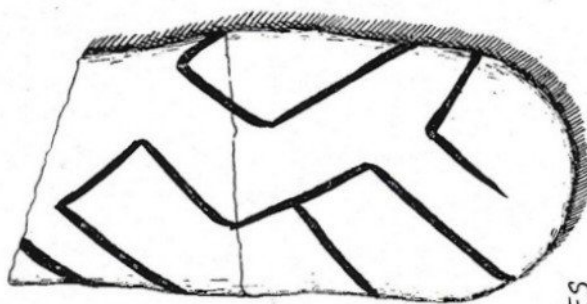
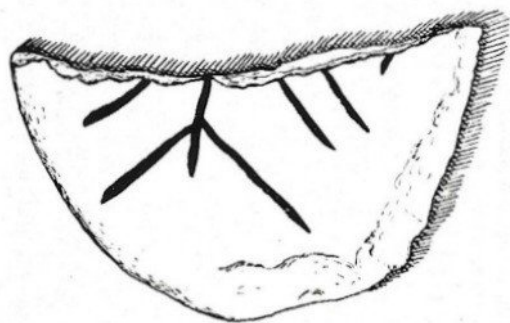
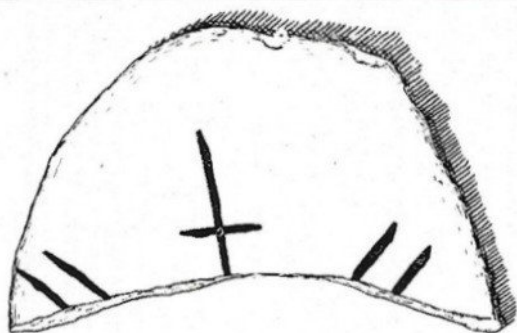
Flat river pebbles, flakes of limestone, and rarely chips of flint, bear designs that have been painted on them. The decorations are usually in black, sometimes in red, one specimen noted on which both colors had been used. Yellow, sometimes found on basketry in Brewster County caves was not noted at Shumla. All of the Shumla caves yielded painted stones at all levels. Plate XXV, XXVII, and XXVIII, reproduce some of the designs thereon. In a former article which was



Plates XXV. and XXVI. Painted pebbles and paint brushes. See pages 74-78.



PAINTED STONES
from
SHUMLA CAVES



PAINTED STONES
from
SHUMLA CAVES

Plates XXVII. and XXVIII. Painted pebbles. See pages 74-78.

published in the bulletin of the Texas Archaeological and Paleontological Society, the writer stated that the black paint employed was probably soot or carbon from the cave ceilings mixed with animal oil. It is quite possible that some of the paint used was so made, but much of it has been found to have been manufactured from powdered manganese ore. One specimen, Plate XXVI, figure 1, which was found by Mr. Guy Skiles, of Langtry, in a cave on the Mexican side of the Rio Grande, was positively painted with manganese applied with a brush. This stone is exceptional in the fact that the pigment was laid on so thickly that the design is in relief. Plate XXV, figure 5, is a reproduction of a painted flint chip.

Paint brushes were found in the caves (see Plate XXVI, figure 2, 3, and 4) but they are of such a nature that they could not have been used in connection with the stones. The brush represented by figure 3 was used with red paint. Pointed stones and sharpened sticks could not have made the lines forming the designs. Only a long and flexible-haired or fibered brush would have carried sufficient paint to have made the unbroken and tapering lines of the nature found on most specimens. An unusual device found in one of the caves, which answers in every way the definition of the word "stylograph", could have been used on the stones the line-work on which does not taper. This is described elsewhere in the report.

River pebbles and smooth flakes of stone were used as palettes. A very large (for the purpose) slab found in Cave No. 6 had been used on both sides, red smeared on one surface, black on the other. Large and small metates and manos were used in grinding pigments, many found with black and red still on them. Red paint was evidently made from earth containing oxide of iron prepared by burning. In the Smith collection at Comstock is a mass of red paint which had been prepared and stored in a hide wrapping, and which still holds the form of the original covering. Small pieces of this same material were taken from the Shumla caves. The Smith specimen is from a cave in Seminole cañon not far from Shumla. Black paint was also formed and stored in lumps. With a burial in Cave No. 5 was a small mass of this material. Its composition was of powdered manganese ore mixed with fat or oil. Its appearance is similar to black grease crayon. It

may be written with in the same manner as such, and, in fact, shows wear from such use.

Manganese outcrops in several places in the vicinity of Shumla. In old Shumla cave was found a coilwork bag filled with small fragments of this ore.

CACTUS

The mummified lower portion of a devil's head cactus (*Homolacephala texensis*) was taken from Cave No. 1. The upper portion bearing the thorns had been cut away, as had the roots. The pulp of the portion found had been removed by scraping with the teeth, complete impressions of the lower incisors having passed through the pulp being clearly discernable. See Plate XXIV, figures 1-b and 1-a.

Mummified cactus of various species, among those recognized being the star cactus (*Ariocarpus fissuratus*), peyote (*Lophopora williamsii*), and several varieties of prickly pear (*Opuntia* sp.), were frequently met in the cave debris. Single leaves of the prickly pear were found which had been pierced and a narrow strip of lechugilla leaf passed therethrough and tied. One specimen had three leaves on one strand, each knotted in a separate loop. This was a simple but effective means of transportation. The skin of a prickly pear leaf, in one instance, had been made into a pouch to hold cedar foliage. The thorns of the devil's head cactus, and those of the fish-hook cactus, both artificially recurved were used in fishing, described elsewhere in this report.

BUCKEYES

Buckeyes (the small Mexican variety, *Ungnadia*) were evidently much eaten by the Shumla Cave inhabitants. A storage basket containing several thousand is depicted by Plate XLI, figure 1. The container is a twined basket about nine inches from top to bottom. In Cave 7, close to the rear wall, depth three feet, three inches, was found a bushel of the buckeyes that had been in a chequer weave matting container, the basketry badly decayed.

NARCOTICS

Two of the American narcotics were known to the Shumla cave inhabitants, the scarlet bean and the peyote, the former represented by twenty specimens from Caves No. 1, No. 3, No. 5, and No. 6, the latter by a single mummified example from Cave No. 5.

Gregory Mason, in his "Columbus Came Late", page 100, wrote—

"The mescal-bean, which in the early days of the white settlements in Texas the aborigines considered worth the price of a horse, is probably a scarlet bean known to botanists as *Sophora secundiflora*. The consumption of this produces a delirious exhilaration followed by a long sleep. Nowadays, however, the term 'mescal-bean' is misapplied to the plant *Lophophora williamsii*, a small fleshy spinless cactus also commonly called 'peyote', a word derived from the Aztec 'peyotl'. This plant looks much like a carrot, but the severed top of it resembles a mushroom."

It is the upper portion of this cactus which is eaten by the Indians for its narcotic effect. Peyote still grows in several places a few miles from the Shumla caves between the Rio Grande and the Pecos, and, the scarlet-bean grows at the mouths of several of the once occupied caves.

Edwin F. Coffin mentions the star cactus (*Ariocarpus fissuratus*) which was found in the Shumla caves, and which he found in the Bee cañon cave, Brewster County, as "said to be used by the Mexicans in the same manner as the peyote button," which, if true, adds a third narcotic to the Shumla list.

SKELETAL MATERIAL

A thorough account of the skeletal material found by the expedition, will be published in a later report. Due to the fact that certain features are of unusual interest, time for exhaustive study will be necessary. The six perfect skulls exhumed are all dolichocephalic, and are not artificially deformed. The cephalic indices range from 67.2 to 72.3 (rough measurement). A peculiar feature of five of the skulls is total lack of molars in the lower jaws. One specimen had never had teeth

in the upper jaw, and contains in the nostrils a growth which almost completely filled them, and which had eaten through the hard palate into the mouth. Plate XLIII, figure 2, is typical of five of the skulls found. The upper molars do not show signs of ever having opposed teeth in the lower jaw, and, the incisors of the upper jaw have been almost completely worn away by the incisors of the lower.

HAFTED SCRAPERS

Two hafted scrapers were found at Shumla, these depicted by Plate XXXIII. The smaller specimen is a mere flake held between two halves of a split sotol stalk and tied with fiber cord. The larger specimen has a blade sunk into a partially split piece of very thick sotol stalk and cemented into place with juagilla gum. Two twigs tied parallel to the handle, one on each side of the blade, strengthened the device. Remnants of the gum still cling to both blade and handle.

MANOS

Manos were found in all of the Shumla caves. Some are mere river pebbles showing the wear of use, others of volcanic and other rocks which have been pecked into shape. These vary much in size, from three and a half to eight inches in length, widths varying to suit the hands that used them. Some show red and black paint on their grinding surfaces. Some of the surfaces which had grown smooth show pecking purposely done to roughen them. Variations in the grinding surfaces indicate varied movements practiced when stones were in use. Plate XXIII, figures 1-a and 1-b.

METATES

Metates found in the Shumla caves were usually made from rough rocks or slabs having two flat surfaces, one on which to rest, the other for milling. Only one exception was found, an oval slab which had been shaped. This specimen had been used on both sides until the depressions of wear almost met in its center. When found it had broken through,

and had been placed in a grave. In it was lying a mano which had worn down until it had taken on the form of a fist-hatchet. Many of the metates are worn only on one side. Occasional specimens, like that pictured by Plate 3, bore a mortar-hole as well as depressions caused by use of the mano. The pictured specimen has two mano depressions as well as the mortar-hole. Metates were very numerous.

MORTARS AND PESTLES

Apart from the mortar-holes sunk in the rocks forming the caves, occasional small rocks containing such depressions were found. Some few stones, of small size that might have been used as pestles in forming some of the shallow depressions were excavated from the debris, but their use for such purpose is questionable. Nothing in the way of a pestle that could have been used in forming some of the larger and deeper mortar-holes was found. A portion of a well-shaped pestle supposed to have been taken from Seminole cañon was seen by the writer in the Smith collection at Comstock.

MANO_FIST_HATCHET_HAMMER_STONE COMBINATION

Most interesting of the larger stone implements at Shumla are the fist-hatchets. These started as manos which, by purposely contrived manipulation, finally wore to an edge on one side, the other remaining thick. Thus a cutting edge and a hammering surface were formed on each, and the stone was still usable as a mano. Many specimens of these were found, some with the sharpened edges nicked from cutting, and the opposing blunt ends pecked from hammering. An average specimen measures four by four and a quarter inches, the hammering end one and one quarter inches thick. Plate XXIII, figures 2-a, 2-b, and 2-c.

MAULS

A single maul, which was first a mano, then a fist-hatchet, and last a hafted hammer was found. Its alteration from fist-hatchet to maul was accomplished by the abrading of a single polished groove on one side from cutting to hammering edges half way between its ends. Both ends show much use, the hammering surfaces being much pecked.

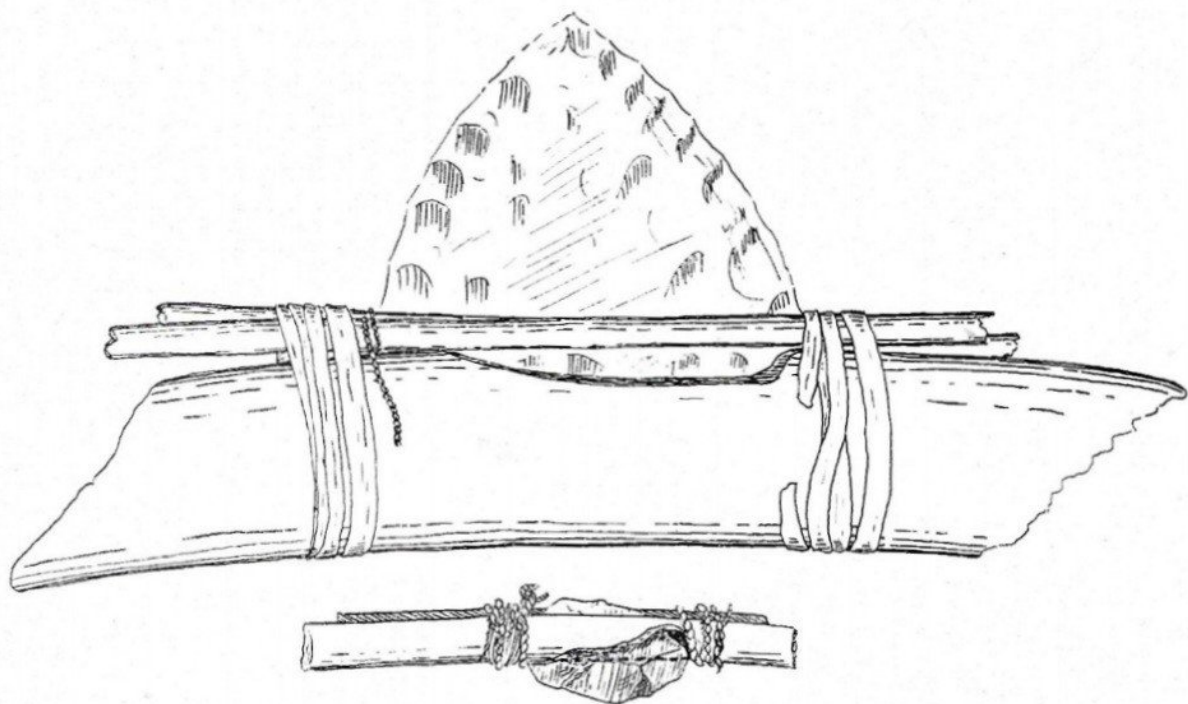
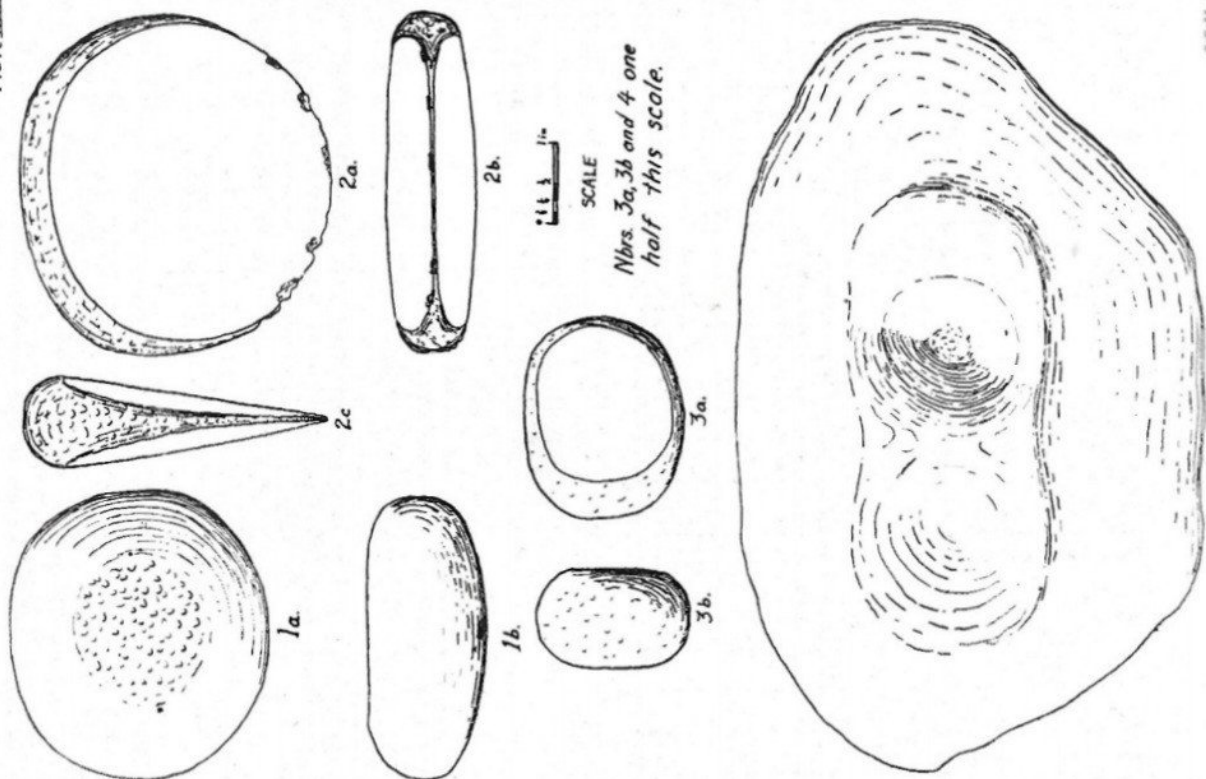


Plate XXIII. Fig. 1, hammerstone; Figs. 2-a, 2-b, and 2-c, fist-hatchet; Figs. 3-a and 3-b, mano; Fig. 4, a metate and mortar combined. See pages 80, 81 and 82.
 Plate XXXIII. Two hafted scrapers. The larger specimen had an extra blade identical in size and shape to that seated in it. See page 80.

PEBBLE-FLAKE KNIVES AND SCRAPERS

A form of knife popular among the Shumla cave inhabitants was made by striking off a side of a pebble with a single blow. Many of these were found, the edges usually showing the wear of use, but never chipping. Scrapers were also made in this same manner the edge usually chipped to some small extent.

HAMMER-STONES

River pebbles with pecked edges showing use in hammering were found. Shaped hammer-stones were less common. The last mentioned type are usually round and flat, three to six inches in diameter and one to three inches in thickness. Some few are larger. Plate XXIII, figures 3-a and 3-b.

PEBBLE FLAKERS AND POLISHED PEBBLES

Numerous flat river pebbles which bear on the broad surface shallow scratches close to but not at the ends were found at all of the caves. These scratches are slightly curving and diagonally placed with the sides of the pebbles. They were apparently used to strike chips or flakes from flint, probably in shaping blanks preparatory to final working. In form these stones are not unlike the painted pebbles mentioned elsewhere in this work, but none of the scratched stones had designs on them. Several stones of like nature, neither painted nor scratched, but bearing a high polish were found. These had been much handled and rubbed and may have been used in softening cured skins.

GRASS TIED STONES

Numerous worked limestone flakes banded with grass were taken from the caves. Five of these were roughly knife-shaped, the sixth a rough mano similarly tied. Three of the specimens found show fragments of leaves beneath the bindings, and it would appear that these stones had been wrapped in leaves before the grass bands were placed thereon. Five

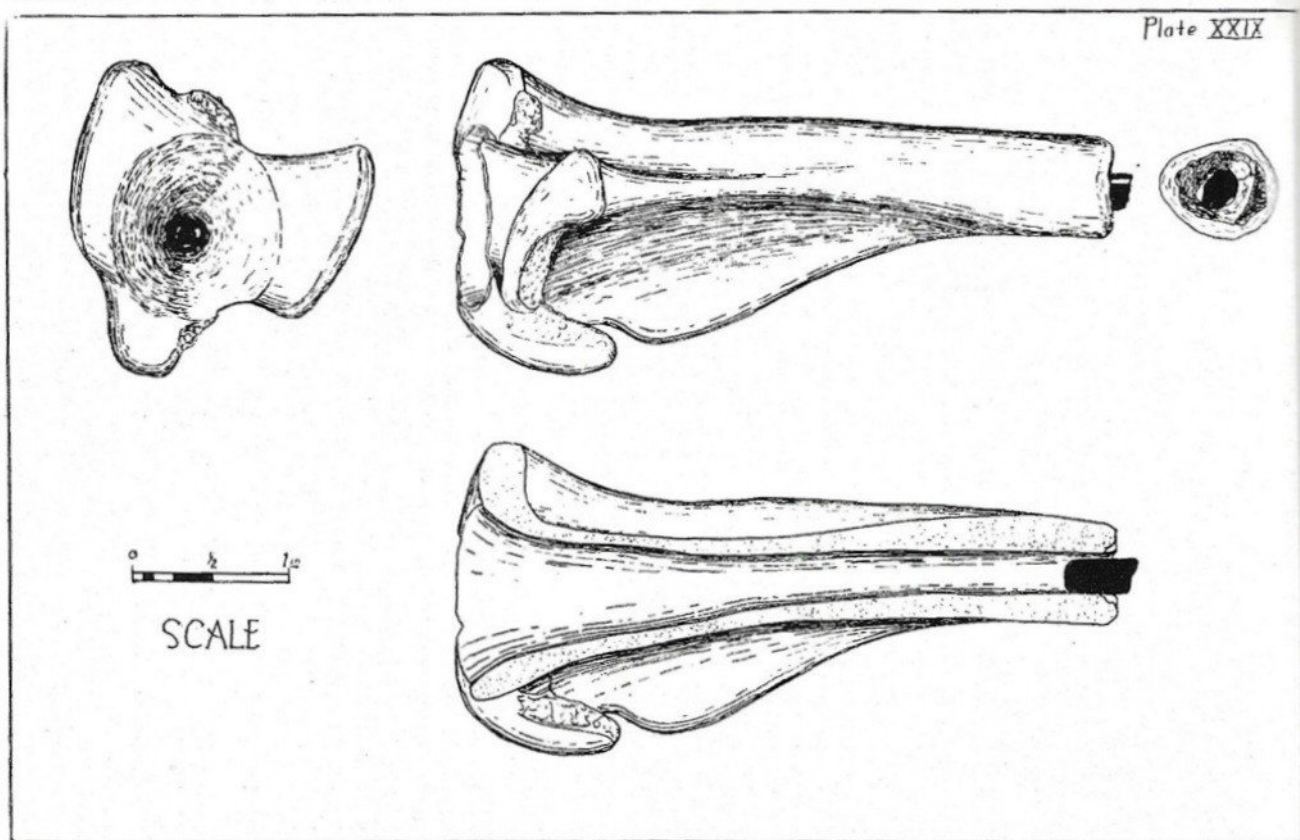
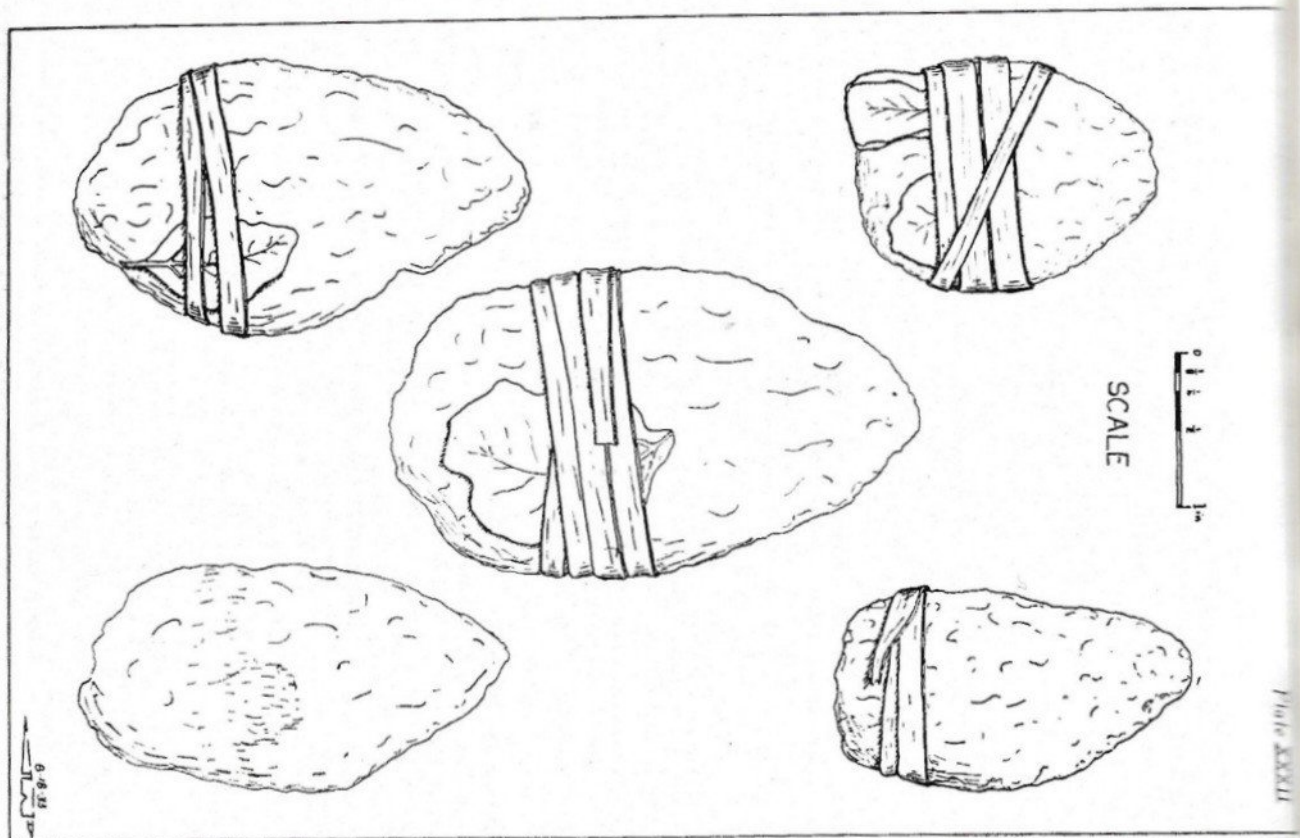


Plate XXXII. Shaped limestone flakes with grass bands. See page 83.
 Plate XXIX. Styloph (?) See page 23.

of these specimens are depicted by Plate XXXII. Similarly wrapped stones found by Edwin F. Coffin, in Bee Cave Cañon, Brewster County (see his work, page 24, figure 1) were rough, unshaped stones, as were those found in Seminole Cañon, Val Verde County by Pearce and Jackson (A Prehistoric Rock Shelter in Val Verde County, Texas, page 118, figure 26.) The Shumla specimens were usually found in pairs, only one found singly.

PROJECTILE POINTS AND OTHER FLINT ARTIFACTS

Projectile points were numerous. With the exception of the fact that very small points, such as are depicted by Plate X, figures 4 and 5, were found only close to the entrances of the caves, all other types were represented in all layers of the debris. Seven distinct types were noted, with many eccentric forms. More time for the study of these will be required, and a report on them will be made at a later date. A single type, somewhat fish-shaped, which is always twisted or spiraled, is worthy of note as one or more specimens of this variety were taken from each of the nine caves excavated at Shumla, and others with the same twist were noted in the hands of local collectors at Langtry.

Crude unworked flakes which had been used as knives were quite numerous. An excellent example found in a basketry sheath depicted by Plate XLI. Two similar knives were found in the same pouch with the depicted specimens. Apart from the specimens already enumerated under this heading, were found several awls with corner tangs, numerous awls and drills, several fist-hatchets flaked from flint pebbles, a single specimen of flint which had been hafted in the manner of a hatchet and which still bears some of the gum with which it was fastened to the handle. Many side-scrappers were found, and a few end-scrappers. Further report on these artifacts will also be made at a later date.

CONCLUSIONS

The caves at Shumla, as evidenced by the remains found in them, were occupied by one people from the time they were first inhabited until they were abandoned. But one culture is indicated. Stone artifacts, matting, basketry, painted pebbles, atlatls, and accompanying accessories, all of one culture, were found at all layers from hard-pan to surface. These people apparently divided their time between surface sites and the caves, not merely using the latter in bad weather, or for storage and burial, as has been reported of many of the caves in the Southwest. Many of the artifacts found are identical with similar specimens classified by Kidder and Guernsey, Nusbaum, Roberts, and others as positively "Basket-maker." Among these are the atlatl, and the articles used therewith, the "rabbit stick" the stone pipe, the wooden scoops, etc.

The writer calls attention to the quotations from the works of Kidder and Guernsey, and from the writings of Nusbaum, which have been printed under the heading "Wooden Scoops" in this report, and to another quotation from Kidder and Guernsey, which is given in this work under the heading "Pipes". Both of these refer to specimens practically identical with those from Shumla as positively "Basket-maker." These items considered with the atlatl, the grooved clubs, and with less important items found in the Shumla caves which are identical with those found in the Basket-maker shelters of the Southwest, apparently identify the Shumla inhabitants as having derived their culture from the Basket-makers of the Southwest, and the writer believes that the appellation "Big Bend Basket Maker," which the Woolford-Martin Expedition of 1931 applied to the inhabitants of the eastern half of the Big Bend, and of the country along the Rio Grande to a point well east of the Pecos to be well applied.

It is true that coiled basketry of "two rod and bundle" weave was not found at Shumla, this an accepted indication of Basket-maker culture. A single specimen of this type of basketry was, however, in the collection of Mrs. Elmo Johnston, of Castelon, Brewster County, in 1931, where it was examined by the Woolford-Martin Expedition. The stitch used by the

Southwest Basket-makers in Arizona, non-interlocking, however, was used in some of the Shumla basketry, and has been reported by Pearce and Jackson as being found in Seminole cañon, and by Mr. Frank Setzler as found in the Big Bend, but used in connection with single bundle foundations. Comparisons of the non-interlocking stitch of the Southwest (see figure 80, page 169, Kidder and Guernsey, "Archaeological Explorations in Northeastern Arizona") with Plate XIX, figure 3 of this report, shows that with the exception of the fact that the foundations of the Southwestern baskets were made with two rods and a small bundle, the actual stitchings were identical. It will be noted that Kidder and Guernsey, on page 168, of the before mentioned work, refer to one specimen found in Arizona which was woven over a single rod foundation. At Shumla various foundations were used. Practically any material that lent itself to the purpose, grass blades, grass stalks, strips of sotol leaf, lechugilla fiber, split rods, and single rods which were split by the act of sewing. An apocynum bundle and thread was used in making one specimen. Comparison of figure 10 page 95, in Jesse L. Nusbaum's "A Basket-maker Cave in Kane County, Utah", with Plate XIX, figure 2, in this report, shows the actual weaving of his "Basket-maker" specimen of bifurcated stitch to be identical with the Shumla examples except in materials composing the foundation. Judging by these examples the writer cannot but believe that the Shumla coiled basketry of these two types and the Southwestern basketry are identical except in so far as the natural resources of the localities in which the baskets were made influenced the materials of which they were manufactured. It is his belief that the single bundle foundation in non-interlocking, and in bifurcated weaves, were identical forms modified by the materials locally obtainable. The commonest coiled basketry weave at Shumla is of single bundle foundation with interlocking stitch, which appears to be a simplified form of the bifurcated stitch. A variation of a single rod weave is reported by Nusbaum in his "A Basket-maker Cave in Kane County, Utah," described on page 96, and pictured by figure 11. To quote Nusbaum "The foundation of the coil consists of a single twig completely encased in a padding of yucca fiber. The sewing splints are caught through the padding and so hold the coils together." This is identical with

the Shumla non-interlocking weave if the twig be omitted. At Shumla two hitherto undescribed coiled basketry weaves were found, and it will be interesting to note future published reports from other localities for specimens susceptible to comparison with these.

Wide variety in sandals from Shumla, nine varieties described in this report, with several hundred specimens yet to be studied for variations, admit of little or no comparison with the sandals of the Southwest, but neither are any of them exactly like those from other sections between the Pecos and the El Paso section of Texas. All reports published so far show wide variations in the sandals found in each section as yet explored. The writer does not find records of most of the Shumla sandal types having been found elsewhere. Further study of these sandals may result in other types being discovered among those brought back by the expedition.

Some few of the Shumla finds, necklaces beaded with rattlesnake vertebrae, the antler or bone atlatl spur, etc. apparently indicate Mexican influence in the culture at Shumla. However, a similar spur was found in a mound in Mississippi, and Kidder and Guernsey depict necklaces woven in the same manner as those found at Shumla, but without the vertebrae beading, which were found in caves in Arizona and attributed to the Basket-maker culture.

The Shumla inhabitants are all dolichocephalic, of rather small stature, with small hands and feet. The two mummies found, on the heads of which hair still remained, show that the latter was worn shaggy and undressed hanging just below the lobes of the ears. Articles of apparel found indicate that some of the men wore gee-strings, some of the women fiber cord skirts. Apparently, as judged by the cave finds, such was the only clothing worn except blankets of fur-cloth, fragments of which were found with almost all the burials. Fur cloth blankets, or portions thereof, were found with each of the infant bodies, and with two of these were additional skins which had apparently been used as coverings. Sandals appear to have been worn by even the tiniest infants. Apparently these Shumla cave dwellers were strongly affectionate, at least, in so far as their children were concerned. A beautifully made tiny sandal, a little necklace of olivella

shells, with pendant, found on an infant mummy, and the great care exercised in the preparing of their children for burial would appear to indicate this. That they had a religion in which a belief in a life after death was included appears to be indicated by the breaking of the cradles and of the fish net interred with some of the mummies found. Careful burial was not always practiced, as evidenced by one in Cave No. 4, the body flexed and tied with cordage, a few pieces of worn out matting packed around it, a flat slab laid upon it. This burial was but two inches below the surface. Mr. Eross, field foreman, aptly described it, as the remains of "an old hag that the Indians considered themselves better off without, kicked into a shallow hole with little or no evidence of care."

Shumla weapons appear to have been the atlatl and its accessories, the former used with both javelin and arrow, stone knives, probably hafted, and possibly daggers of bone. The bow does not appear to have been known to them. A "bow" and a "quiver of arrows" reported by the newspapers as being taken from a Pecos cave by a trespassing amateur, in the summer of 1933, proved on examination to be a stick with a notch in one end, and a bundle of unworked reeds.

Articles used in fishing found in the Shumla caves, hooks, lures, nets, fish-stringers, a fish knife, etc., are of particular interest, little data concerning such items being included in hitherto published reference works.

All of the Shumla caves were accompanied by external sites located on the cliffs above them. Stone artifacts found in caves, and those on the external sites are identical in forms. Burned rock mounds, these resulting from the cooking of the sotol crowns are almost non-existent on the Shumla surface sites. They are also non-existent in the interior of the caves. Small hearths of burned rocks were found back in most of the caves, but most of the cooking appears to have been done at the entrances under the overhang. While there are no evidences of pits or mounds of burned stone where the cooking was done, burned stones are thickly scattered all through the debris at the entrances and these may have, at one time, been used in the sotol cooking. Apparently everything of edible nature was consumed by the Shumla cave dwellers,

snails, mussels, land and water turtles, and snakes, if the bony refuse of the caves may be taken as indications. Identified animal bones are those of the skunk, civet cat, beaver, squirrel (large and small varieties) deer, coyote, bison, wolf, rabbit, wild cat and antelope. All available fish were eaten, these recognized by their bones, and in two cases by their scales, catfish, gar, and buffalo fish. A claw of a crayfish, legs and portions of the shell, indicate that this crustacean formed part of the Shumla diet. The bird bones found were all those of small species, none of a size that would indicate turkeys were known at Shumla. The long bones of deer were usually split, possibly for the marrow, primarily for the material with which to manufacture bone implements. The marrow was probably eaten, but in only one case where bison bones were found, were these split as would have been the case had the marrow been desired. No implements recognizable as being of bison bones were found.

Possible vegetable foods found at Shumla in the caves included the leaves and fruit of the prickly pear (*Opuntia* sp.), mesquite beans (*Prosopis glandulosa*), acorns (*Quercus*) of two species, one round the other long and slender, juagilla beans (*Havardia brevifolia*), sotol crowns (*Dasyilirion* sp.), buck-eyes (*Ungnadia*), gourd seeds (not classified), mummified fruit of the yucca (*yucca treculeana*), and roots of that plant in similar condition, and cuds of lechugilla (*Agave lechugilla*). Various cactus fruits and plants, also mummified, include the devil's head (*Homolacephala texensis*), one specimen of the latter still retaining the marks of teeth in it. Various small seeds of grasses which have not been classified were found, some in the depression of a metate, on which lay a mano, the seeds clinging to both. Persimmon (*Diospyrus texana*) bushes grew at the entrances of most of the caves, so it may be presumed that the fruit was eaten. Beans of the catsclaw (*Acacia roemeriana*) were encountered in their pods. The laurel bean has been mentioned under the heading "Narcotics". A resident of Shumla who had lived for a long time in Mexico states that the natives there crushed this bean and fed it to the chickens of neighbors. The chickens became stupified and then unconscious, and were easily captured without commotion, thus acquiring new owners. No corn, pumpkin, nor beans (other than beans of native trees) were found

in the Shumla caves. Pearce and Jackson also report not having found these food stuffs in Seminole cañon. Coffin found corn and squash seeds in Brewster County. Mrs. Elmo Johnston has not found corn in her Brewster County caves close to the Rio Grande, and, the Woolford-Martin Expedition found no trace of it in the Chisos mountains, nor in Marivillas and Reagan cañons, all in Brewster County, in caves distant from the Rio Grande. Lack of soil near Shumla may account for the absence of agriculture, but it appears more likely that the cave dwellers close to the river supplemented their wild vegetable and meat diet with products of the river, which did away with some of the necessity for agricultural labor. Apparently, some grasses and seed-bearing bushes and trees were purposely planted. Chewed cuds of lechugilla were found in all of the caves. Four squash seeds in a grass container found by Woolford and Martin in 1931 indicate that this vegetable was known at Shumla.

A clue to the probable type of structure used by the Shumla cave dwellers on their external campsites is found in the grass covered, frame partition mentioned in the text and roughly depicted by Plate XXXVII.

No articles of European manufacture were found at Shumla, all evidences pointing to the caves having been inhabited only in pre-Columbian times. Old Shumla cave, a very dry shelter contains stalactites over an inch in length which have formed since the ceiling of the cave was last sooted. This condition appears to indicate considerable time passed since the cave was last occupied.

No articles of clay, fired or unfired, were found in any of the Shumla caves excavated, and nothing of like nature on the surface sites.

Dr. Daniel R. De la Borbolla, of the National Museum of Mexico, while exhibiting the famous Monte Alban jewels in the Witte Memorial Museum, examined carefully the specimens collected at Shumla. Dr. de la Borbolla stated that detachable atlatl spurs were not at all common in Mexico. He remembered seeing but two specimens of this type. The hafting of projectile points and scrapers with gum-cement was entirely new to him. The Doctor expressed his great interest in the "stylograph", the net needles, grooved clubs, atlatls and their accessories.

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